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DETERMINATION OF SEX BASED ON THE SHAPE AND SIZE OF THE HYOID BONE IN THE POPULATION OF BOSNIA AND HERZEGOVINA

SHORT TITLE: SEXUAL DIMORPHISM OF THE HYOID BONE

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ABSTRACT

The hyoid bone is typically a „U” shaped bone present in the anterior aspect of neck at the level of the fourth cervical vertebra, located between the mandible and thyroid cartilage. This bone displays morphological and morphometric characteristics that can assist in determination of age, sex and race of an individual.

Aim: Therefore, the present study aimed to investigate the morphological and morphometric parameters of the hyoid bone in the Bosnian and Hercegovina population.

Material and methods: Sixty adult human hyoid bones (32 male and 28 female) were used as material in this study. The morphological analysis included the macroscopic identification of the shape of the hyoid bones, and the morphometric analysis included the measurement of eight parameters using a standard digital vernier caliper keeping the bone on flat surface in anatomical position.

Results: In this study, 40.6 % of hyoid bones were „U” shaped and 59.4 % were „V” shaped in males, whereas in the female specimens, 64.3 % of hyoid bones were „U” shaped and 35.7 % „V” shaped. Values obtained for all eight parameters of hyoid bone were higher in males compared to females.

Conclusion: All parameters used in the present study confirmed sexual dimorphism in hyoid bone. Hence, hyoid bone can be considered in forensic investigations or anthropological studies to determine the sex of an individual.

Key Words: hyoid bone, shape, morphometry, sexual dimorphism

Introduction

Determination of sex is the first and crucial step in the process of identifying human remains in forensic casework [1,2]. Determining sex on the basis of human skeletal remains is a century-old problem, especially if sex needs to be determined using isolated bones. Different bones have different degrees of accuracy in sexing the adult from the skeletal remains. The degree of accuracy is 100% in complete skeleton, 95% for the pelvis, 90% for the skull, 98% for the pelvis and skull together, 80% for long bones [3]. Previous research has shown that morphological and morphometric analysis of the hyoid bone can also be a useful technique in determining sex skeleton [4].

Hyoid bone is a „U” shaped bone and part of viscerocranium placed between the tongue root and thyroid cartilage to which it is connected by thyrohyoid membrane. It is placed at the level of the fourth cervical vertebra and articulates with surrounding structures via muscles (suprahyoid and infrahyoid muscle groups) and ligaments (stylohyoid ligaments). It is also called an unsocial bone as it doesn't form any joint directly with other bones. It consists of a central part called body and a pair of cornua, and the greater and the smaller cornu [5]. Initially, it is a cartilaginous tissue which by age increasing gradually turns to bone [6-9]. The hyoid bone plays an important role in speaking, swallowing, preventing the reflux and maintaining the airway [6].

The present study aims to determine the sex of an individual based on the morphology and morphometric characteristic of the hyoid bone in the Bosnian and Hercegovina population.

Materials and Methods

Sixty adult human hyoid bones (32 male and 28 female) were used as material in this study. The hyoid bones of known sex and age (57 ± 19), without visible gross pathology, deformities or traumatic lesions were included in the study, were taken from the osteological collection of the Department of Human Anatomy, Faculty of Medicine, University of Sarajevo. The hyoid bones were subjected to morphological and morphometric analysis.

Morphology of the hyoid bone

The shapes of hyoid bones were macroscopically noted and classified according to the system described by Deepak et al. as either „U” or hyperbolic shaped or „V” or parabolic shaped [10].

The shape of the hyoid bone, where the width is equal to or less than the length is noted as hyperbolic or „U” shaped, and the shape of the hyoid bone where the width is greater than the length is noted as parabolic or „V” shaped.

Morphometry of the hyoid bone

Morphometric measurements were performed using digital vernier calipers 0-1000 mm, 0.05 mm, Metric 530-502 (Mitutoyo Corporation, Japan), with a margin of error of 0.01 mm. All the measurements were repeated three times and the mean was taken for further analysis. Furthermore, the measurements were recorded by the same person to minimize the errors in methodology.

The following morphometric measurements were taken on each hyoid bone and keeping the bone on flat surface in anatomical position (Figure 1):

- a. Length of right greater cornua (distance between junction of right lesser cornua and body to the tip of right greater cornua)
- b. Length of left greater cornua (distance between junction of right lesser cornua and body to the tip of right greater cornua)
- c. Breadth or width of hyoid (distance between the distal ends of greater cornua)
- d. Length of hyoid (distance between a line through the distal ends of the greater cornua and center of hyoid body)
- e. Minimum transverse distance between bases of lesser cornua
- f. Width (side to side length) of the body in the midline
- g. Distance between the upper and lower margins of the body (height)
- h. Thickness (antero-posterior) of body in the middle

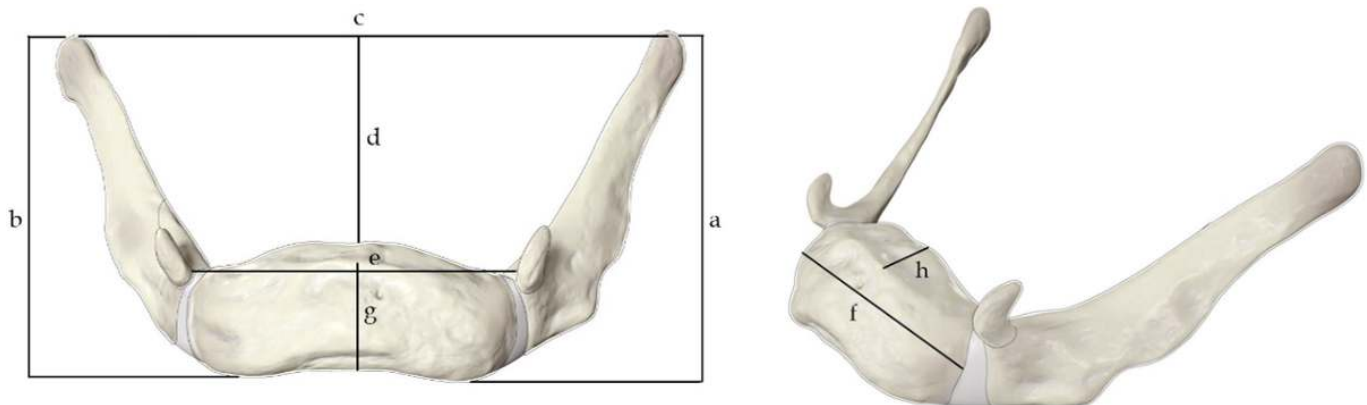


Figure 1. Diagram showing parameters (a to g) taken on each hyoid bone.

Statistical Analysis

All parameters were tabulated and statistically analyzed as mean, standard deviation and range using SPSS version 19 (SPSS Inc., Chicago, IL, USA), and data were compiled in Microsoft Excel 2020 (Microsoft Corp., Redmond, WA, USA). The chi-square test and the T-test were utilized to determine if there were any statistical significance differences. A P-value less than 0.05 was accepted as the level of statistical significance for this study.

Results

Morphology of the hyoid bone

This study examined 60 hyoid bones, the „U” shaped hyoid bone more prevalent than the „V” shaped hyoid bone, with an incidence of 51,7 % and 49,3 %, respectively. The present study documented

that 40,6 % and 59,4 % of the males had a „U” shaped and „V” shaped hyoid bones, respectively. However, „U” shaped hyoid bone was most prevalent among the females in this study, with an incidence of 64,3 %, while the remaining 35,7 % of female hyoid bones was „V” shaped. This study found a statistically significant relationship between the shape of the hyoid bone and sex, with a p-value of 0.027. The results were collectively shown in Table 1.

Morphometry of the hyoid bone

By analyzing our study all the above eight parameters of the hyoid bone were more in males than females which are either highly significant ($p < 0.001$) or significant ($p < 0.005$). The mean and standard deviation of all parameters were calculated and tabulated in Table 2.

| Shape | Male (n=32) | Female (n=28) | Total (n=60) | P - value |
|------------|-------------|---------------|--------------|-----------|
| U - shaped | 13 (40.6%) | 18 (64.3%) | 31 (51.7%) | 0.027 |
| V - shaped | 19 (59.4%) | 10 (35.7%) | 29 (49.3%) | |

Table 1. Frequency of shapes of hyoid bone for sex

| SN | Anthropometric parameters | Males (N= 32) | | Females (N=28) | | p-value |
|----|---|---------------|-------------|----------------|-------------|---------|
| | | Mean ± SD | Range | Mean ± SD | Range | |
| a | Length of right greater cornua (distance between junction of right lesser cornua and body to the tip of right greater cornua) | 31.31±2.65 | 29.75-37.6 | 28.78±2.71 | 23.89-29.25 | P<0.005 |
| b | Length of left greater cornua (distance between junction of left lesser cornua and body to the tip of left greater cornua) | 31.69±2.61 | 27.49-37.65 | 28.30±2.55 | 23.63-33.00 | P<0.001 |
| c | Breadth or width of hyoid (distance between the distal ends of greater cornua) | 37.45±6.90 | 23.66-51.59 | 33.19±5.19 | 20.37±41.50 | P<0.001 |
| d | Length of hyoid (distance between a line through the distal ends of the greater cornua and center of hyoid body) | 35.85±2.93 | 17.68-47.43 | 31.95±2.88 | 26.01-37.22 | P<0.001 |
| e | Minimum transverse distance between bases of lesser cornua | 19.04±3.40 | 13.03-27.20 | 18.62±2.77 | 12.57-23.20 | P<0.001 |
| f | Width (side to side length) of the body in the midline | 23.75 ±2.49 | 18.20-28.70 | 20.39 ± 2.12 | 13.20-24.70 | P<0.001 |
| g | Distance between the upper and lower margins of the body (height) | 11.58±1.43 | 9.25-15.09 | 10.26±1.06 | 8.75-12 | P<0.001 |
| h | Thickness (antero-posterior) of body in the middle | 6.29 ±1.84 | 4.75-9.25 | 5.63 ±0.97 | 4.4-8.25 | P<0.001 |

Table 2. Statistical analysis of the studied parameters of hyoid bone in male and females

| Study | Year | Male | | Female | |
|----------------------|------|-----------|-----------|-----------|-----------|
| | | U - shape | V - shape | U - shape | V - shape |
| Leksan et al. | 2005 | 45.7 % | 48.6 % | 42.8 % | 34.3 % |
| Deepak et al. | 2013 | 44.0 % | 56.0 % | 55.0 % | 45.0 % |
| Shangase et al. | 2019 | 35.0 % | 65.0 % | 70.0 % | 30.0 % |
| Present study | 2024 | 40.6% | 59.4% | 64.3% | 35.7% |

Table 3. Comparison of Shape of Hyoid Bone of Present Findings with Previous Workers

Discussion

In the identification process of a deceased person determining the sex, age and race of the deceased is of vital importance. Identification of an individual is of great importance in criminal investigations. Using the human pelvis or on the skull alone, sex can be determined with only 95% or 92% accuracy. Metric analysis of the hyoid bone can also be a useful technique in determining sex skeleton, which was proven by this presented study.

Morphology of the hyoid bone

This study reported that the „V” shape hyoid bone was most prevalent in males (59.4 %), while the „U”

shape is most prevalent in females (64.3 %) (Table 1). The present study also recorded a statistically significant relationship between the shape of the hyoid bone and sex (p-value = 0.027). These findings correlate with previous studies by Leksan et al., Deepak et al. and Shangase et al. (Table 3) [11,10,12].

Morphometry of the hyoid bone

The male hyoid bones were found to be larger compared with female hyoid bone under all parameters. This finding was similar when compared with other studies (Table 4) [13, 14, 15, 16, 17, 18, 19]. Table 2 shows that the maximum sexual dimorphism was recorded for parameters c, d and f (width of hyoid bone, length of hyoid bone and width

| Anthropometric parameters | | Santhi Priya et al. | Kopuz et al. | Ramagalla et al. | Harjeeth et al. | Savitha et al. | Priya et al. | Amgain et al. | Present study |
|---------------------------|---|---------------------|--------------|------------------|-----------------|----------------|--------------|---------------|---------------|
| a | M | 32.37 ± 2.12 | 25.61 ± 4.53 | | 33.59 ± 2.76 | 31.58 ± 3.17 | 32.58±2.34 | 32.78±2.44 | 31.31±2.65 |
| | F | 28.42 ± 2.32 | 24.32 ± 4.11 | | 29.79 ± 2.75 | 29.04 ± 3.32 | 28.43±2.34 | 28.89±2.47 | 28.78±2.71 |
| b | M | 32.58 ± 2.34 | 25.44 ± 4.50 | | 33.90 ± 2.84 | 30.04 ± 3.25 | 32.37±2.12 | 32.67±2.48 | 31.69±2.61 |
| | F | 28.43 ± 2.34 | 24.79 ± 4.11 | | 29.66 ± 2.38 | 27.78 ± 2.71 | 28.42±2.32 | 28.71±2.64 | 28.30±2.55 |
| c | M | 33.29±4.66 | 34.07 ± 4.19 | 33.13 ± 4.97 | 33.42 ± 3.38 | 37.41 ± 6.79 | 33.29±4.66 | 34.25±4.81 | 37.45±6.90 |
| | F | | 31.88 ± 3.46 | 28.26 ± 2.73 | 27.65 ± 3.08 | 35.69 ± 6.70 | 28.02±2.80 | 31.21±2.38 | 33.19±5.19 |
| d | M | 36.51 ± 2.72 | 28.30 ± 4.34 | | 38.66 ± 3.29 | 35.15 ± 3.15 | | | 35.85±2.93 |
| | F | 1.92 ± 2.76 | 28.36 ± 4.73 | | 34.05 ± 2.85 | 33.35 ± 5.85 | | | 31.95±2.88 |
| e | M | | | | 24.45 ± 2.35 | | 21.71±3.18 | 20.34±3.82 | 19.04±3.40 |
| | F | 28.02 ± 2.80 | | | 20.48 ± 2.42 | | 18.24±2.9 | 18.45±2.91 | 18.62±2.77 |
| f | M | | | | 24.03 ± 2.36 | | 23.24±3.07 | 22.51±3.73 | 23.75 ± 2.49 |
| | F | | | | 20.29 ± 1.55 | | 20.0±1.47 | 20.27±1.75 | 20.39 ± 2.12 |
| g | M | | | | 6.58 ± 1.88 | | 6.14±1.90 | 6.45±1.79 | 11.58±1.43 |
| | F | | | | 5.10 ± 0.95 | | 5.60±0.97 | 5.66±0.97 | 10.26±1.06 |
| h | M | 11.85 ± 1.53 | 15.35 ± 2.85 | 11.85 ± 1.55 | 11.04 ± 1.10 | 10.09 ± 1.40 | 11.85±1.53 | 12.18±1.38 | 6.29 ± 1.84 |
| | F | 10.04 ± 1.01 | 14.16 ± 3.08 | 10.00 ± 1.07 | 9.47 ± 1.08 | 9.55 ± 1.03 | 10.04±1.01 | 11.21±1.15 | 5.63 ± 0.97 |

Table 4. Comparison of present study with other studies

of the body in the midline) while parameters e and g (minimum transverse distance between bases of lesser cornua, distance between the upper and lower margins of the body) were least dimorphic among study population.

Conclusion

After studying different shapes of hyoid bone, the authors concluded that in males V-type and in females U-type of hyoid bone were the leading types. All the parameters considered in the present study were showing significant sexual dimorphism as male hyoid bones were much larger in size when compared to female hyoid bones. These parameters can be considered in forensic investigations for the sex determination of an individual.

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Conflict of Interest:

The authors declare that they have no conflict of interest..

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EXPLORING THE INTERRELATIONSHIP OF GINGIVAL RECESSION, DENTINE HYPERSENSITIVITY AND ORTHODONTIC TREATMENT IN YOUNG ADULTS: A RESEARCH STUDY

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ABSTRACT

Background: The objective of this research is to examine the connection between gingival recession, dentine hypersensitivity and conducted orthodontic therapy in young adults.

Materials and methods: The research is conducted on 50 healthy, young subjects. The subjects received consent forms for participation in the research. In their anamnesis, the subjects provided information about their general health, oral hygiene habits, completed orthodontic therapy and gingival recessions on the buccal side of all teeth were documented by the clinical gingival examination. In the case of the presence of dental plaque, initial periodontal therapy was conducted. After documenting gingival recession on each tooth with a recession on the vestibular side, an examination of dentine hypersensitivity was conducted using an air blast from a distance of around 2 cm. All obtained data were documented in the work chart especially designed for this research. Results: Of 1400 examined teeth, 946 teeth were with no gingival recessions present, and 454 teeth were with gingival recessions present. Out of that number, 186 (41%) were with dentine hypersensitivity, whereas in the group with no gingival recessions present, dentine hypersensitivity was recorded only in 12 teeth (1.3%). In patients that were orthodontic patients out of the total number of teeth (644), a gingival recession was noticed in only 209 teeth.

Conclusion: The occurrence of gingival recessions is connected to the occurrence of dentine hypersensitivity. Orthodontic therapy is listed as a factor in the occurrence of gingival recessions, but many other factors should be taken into consideration. Still, there is not enough evidence that would suggest that one method of brushing teeth or a type of toothbrush is more effective than the other in the prevention of the occurrence of gingival recessions. Excessive diversity of samples and methodology design in certain studies make it difficult to detect ideal techniques.

Keywords: recession, dentine hypersensitivity, orthodontic therapy

Introduction

A gingival recession occurs when the marginal gingiva moves from the cemento-enamel junction toward the tooth's root. It can be localized or generalized and affect one or more tooth surfaces. This condition often leads to esthetic problems for patients and the fear of losing a tooth. Additionally, gingival recession can cause dentine hypersensitivity and root caries, which are common reasons for visiting dental practices [1,2,3]. There are two main types of recession: one is related to periodontal disease, and the other to mechanical factors such as using a toothbrush. However, there may be other causes that contribute to this condition.

Current studies indicate that gingival recession has multiple causes [4, 5, 6].

Various factors can contribute to dental problems, but dental plaque is a primary cause [1,7]. Other factors to be considered include using hard toothbrushes, incorrect brushing techniques, high frenulum insertion, teeth position in the dental arch, movement of teeth due to orthodontic forces, traumatic occlusion, subgingival restorations [1], periodontitis, erosion (chemical or electro-chemical degradation of dental tissue), friction, tooth wear (endogenous mechanical wear), and abrasion (exogenous mechanical wear) [4,6,8].

There is a growing demand for orthodontic therapy among patients wishing to improve the appearance and function of their teeth [9]. However, like any other medical therapy, orthodontic therapy can have unwanted side effects. One of the most common complications of periodontium in patients undergoing orthodontic therapy is the development of gingival hyperplasia and gingival recession [9,10]. Studies have shown that up to 12% of orthodontic patients may develop gingival recession [10]. Orthodontic tooth movement outside of the alveolus and a decrease in the height of the keratinized gingiva can result in changes leading to gingival recession [9].

However, different lesion morphologies connected with the prevalence of specific etiological factors in the cervical area [4,8,11] often result in the occurrence of wedge-shaped or concave lesions [4,12]. Taking into consideration the combined

effects of all or certain etiological factors, the occurrence of gingival recessions can contribute to exposure to dentine and the occurrence of dentine hypersensitivity [4].

Dentine hypersensitivity is a common clinical problem with an increasing rate of prevalence. For patients, it represents a long-term painful discomfort, and for dentists, it represents a diagnostic and therapeutic challenge [13,14,15].

It is defined as a short and painful ache that occurs in exposed dentine as a response to thermal, chemical, tactile or osmotic stimuli which cannot be attributed to any other defect or tooth pathology [15,16].

The frequency of the occurrence of dentine hypersensitivity ranges from 3 – 57%, and it is more common in patients suffering from periodontal disease, 72 – 98% [13,17].

Nevertheless, epidemiological studies linking gingival recession and dentine hypersensitivity are not common, due to the difficulties in attaining and comparing data from different populations [1]. Even within the same population the differences in clinical characteristics and risk factors that these conditions include must be further researched.

The objective of this research is to examine the connection between gingival recession, dentine hypersensitivity and conducted orthodontic therapy in young adults.

Materials and methods

The research was done in the form of a clinical prospective study and was conducted on 50 healthy young adults coming for a regular dental examination.

All of the subjects were examined at the Department of Oral Medicine and Periodontology at the Faculty of Dentistry in Sarajevo. The subjects were given a consent form for participation in the research to sign before the anamnestic-diagnostic procedure.

After conducting anamnesis in which the subjects provided data about their general health, oral hygiene habits and completed orthodontic therapy, a

clinical examination including examination of the gingiva and gingival recession on the buccal side of all teeth was performed. Initial periodontal therapy was conducted in the case of plaque presence.

After documenting gingival recessions in every tooth with a recession on the vestibular side, an examination of dentine hypersensitivity was conducted using an air blast from a distance of around 2 cm.

All obtained data were documented in the work chart especially designed for this research.

Results

The results were processed by standard statistical methods, using the SPSS computer program for statistical analyses (SPSS – Statistical Package for Social Sciences), version 21.0. The results were shown as absolute numbers N and percentage values %. The Chi-square test was used in the analysis of the dependence between the category variables. The value $p < 0.05$ was taken as statistically significant.

Table 1 shows the baseline characteristics of the subjects.

The total number of subjects was 50, and the total number of examined teeth was 1400. 19 of them (38%) were male subjects, whereas the remaining 31 (62,0%) were female. When it comes to brushing use, 1 of them (2,0%) uses an electric brush, 41 (82,0%) use a soft brush, 7 (14,0%) use a medium hard brush, whereas 1 (2,0%) use a hard brush. Out of additional products, 32 subjects (64,0%) use dental floss, 15 (30,0%) use an oral rinse, whereas 1 subject (2,0%) uses a water-pic oral shower. The scrub brush method was used by 10 subjects (20,0%), whereas the remaining 40 (80,0%) used the modified Stillman brushing technique. Completed orthodontic therapy (wore a fixed dental appliance) was ascertained in 14 subjects (28,0%), in 6 (12,0%) there was completed orthodontic therapy – mobile dental appliance, in 2 (4,0%) there was no completed orthodontic therapy – mobile dental appliance, whereas 28 subjects (56,0%) were not orthodontic patients.

Total number of patients

50

Total number of examined teeth

1400

Sex

Male – 19 (38,0%)

Female – 31 (62,0%)

Type of brush

Electric – 1 (2,0%)

Soft – 41 (82,0%)

Medium hard – 7 (14,0%)

Hard - 1 (2,0%)

Additional products

Dental floss – 32 (64,0%)

Oral rinse – 15 (30,0%)

Water-pic oral shower – 1 (2,0%)

Brushing techniques

Scrub brush method – 10 (20,0%)

Modified Stillman brushing technique
– 40 (80,0%)

Orthodontic therapy

Completed orthodontic therapy
(wore fixed dental appliance) – 14 (28,0%)

Completed orthodontic therapy
– mobile dental appliance – 6 (12,0%)

Not completed orthodontic therapy
- fixed dental appliance – 2 (4,0%)

Not completed orthodontic therapy
– mobile dental appliance – 0 (0,0%)

Was not an orthodontic patient – 28 (56,0%)

*Results are shown as absolute numbers (N)
and percentage values (%)*

Table 1
Baseline characteristics of the subjects

Additionally, about the total number of examined teeth, there was no significant dependence ascertained between the occurrence of recession and orthodontic therapy ($p=0,944$) (table 2).

There was no significant dependence ascertained between the occurrence of recession and the need for periodontal treatment ($p=0,944$) (table 2).

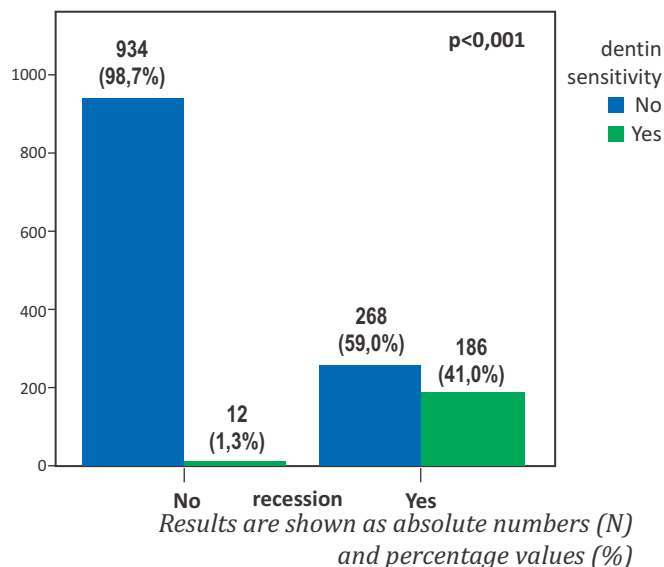
| | Recession | | p |
|---|-------------|-------------|-------|
| | No | Yes | |
| The need for periodontal treatment | | | 0,516 |
| NO | 325 (68,7%) | 148 (31,3%) | |
| YES | 621 (67,0%) | 306 (33,0%) | |
| Orthodontic therapy | | | 0,944 |
| completed orthodontic therapy (wore fixed dental appliance) | 265 (67,6%) | 127 (32,4%) | |
| completed orthodontic therapy – mobile dental appliance | 131 (66,5%) | 66 (33,5%) | |
| not completed orthodontic therapy – fixed dental appliance | 39 (70,9%) | 16 (29,1%) | |
| not completed orthodontic therapy | 511 (67,6%) | 245 (32,4%) | |

Results are shown as absolute numbers (N) and percentage values (%)

Table 2

Dependence between the occurrence of recession, the need for periodontal treatment, and orthodontic therapy

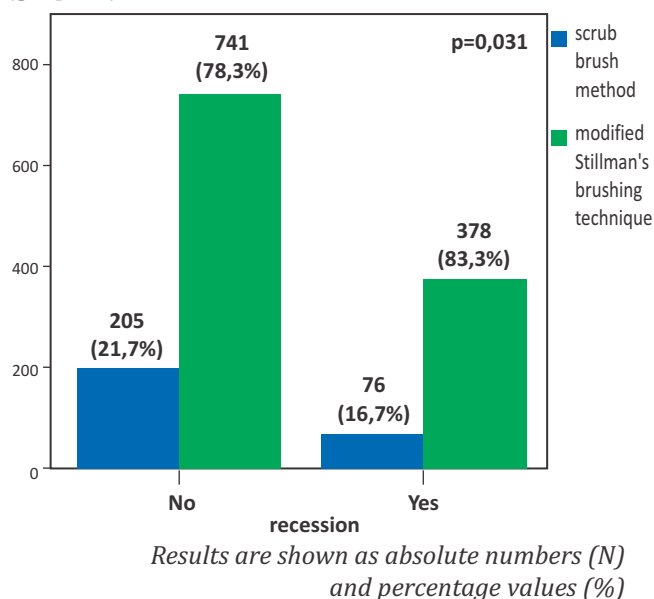
The ascertained difference in the frequency of occurrence of dentine sensitivity concerning the presence of recession was statistically significant ($p<0,001$) (graph 1).



Graph 1.

Dependence between the occurrence of recession and dentine sensitivity

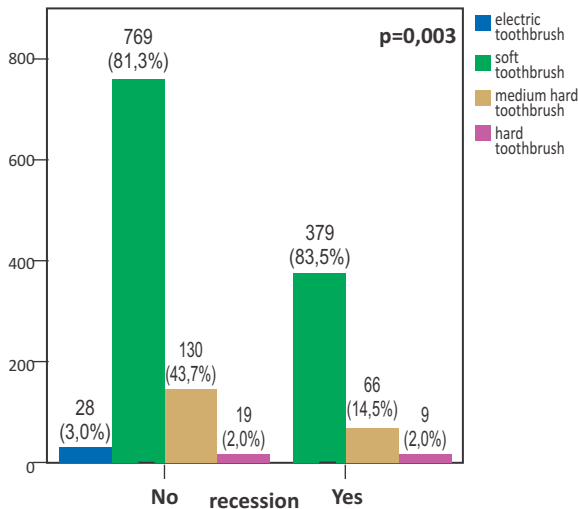
The ascertained difference in the frequency of brushing techniques concerning the presence of recession was statistically significant ($p=0,031$) (graph 2).



Graph 2

Dependence between the occurrence of recession and brushing technique

The ascertained difference in the frequency of use of different types of toothbrushes concerning the presence of recession was statistically significant ($p=0,003$) (graph 3).



Results are shown as absolute numbers (N) and percentage values (%)

Graph 3

Dependence between the occurrence of recession and the type of toothbrush is used

Discussion

The research was conducted on 50 young adults who responded to the Department of Oral Medicine and Periodontology. The total number of examined teeth in subjects was 1400 (table 1).

In our research, of the total number of examined teeth, 454 of them had gingival recessions present, or 32,4%, whereas 946 or 67,6% of teeth were with no gingival recessions present. The role of dental plaque and gingivitis in the etiology of gingival recessions was examined in numerous earlier epidemiological studies, where the inflammation of the gingiva was listed as one of the important favoring factors in the occurrence of gingival recessions [18,19]. In the results of our research out of the total of 1400 examined teeth, 927 teeth required treatment, and 453 teeth were without the need for periodontal treatment. Of the teeth requiring periodontal treatment 621 (67,0%) were teeth with no gingival recessions present, and 306 (33,0%) were with gingival recessions present, so no significant

dependence was ascertained between the occurrence of recession and the need for periodontal treatment ($p=0,516$) (table 2). These results also correspond to the results of other authors [1,20].

The occurrence of gingival recessions after orthodontic therapy is considered to be one of the frequent occurrences (21). In our research, of the total 1400 examined teeth, 644 teeth were included in orthodontic therapy, out of that number 435 teeth were without recessions, and in 209 teeth gingival recessions were recognized. Of this number, 127 wore a fixed orthodontic appliance. Therefore, no significant dependence was determined between the occurrence of recession and orthodontic therapy ($p=0,944$) (table 2). These results do not correspond with the results of other authors who linked the occurrence of gingival recessions to orthodontic therapy [1,21,22,23,27], but they do correspond with the results of authors [9,24].

The results of our research show that out of the total of 946 teeth with no recession present, 934 of them (98,7%) did not have dentine hypersensitivity, whereas the remaining 12 (1,3%) did. Of the total of 454 teeth with recession present, 268 of them (59,0%) did not have dentine hypersensitivity, whereas the remaining 186 (41,0%) did. The ascertained difference in the frequency of occurrence of dentine sensitivity concerning the presence of recession was statistically significant ($p<0,001$) (graph 1). These results correspond with the results of other authors [4,25,26,28] who have proven in the results of their researches that dentine hypersensitivity is connected to the occurrence of gingival recessions.

Out of the total of 946 teeth with no recession present, 205 of them (21,7%) applied the scrub brush method, whereas the remaining 741 (78,3%) used the modified Stillman brushing technique. Of the total of 454 teeth with recession present, 76 of them (16,7%) applied the scrub brush method, whereas the remaining 378 (88,3%) used the modified Stillman brushing technique. The ascertained difference in the frequency of brushing techniques concerning the presence of recession was statistically significant ($p=0,031$) (graph 2).

Here it is important to emphasize that most of the subjects in both groups, with recession and without a recession, used the Stillman brushing technique, which can be understood that it cannot be said that

one technique is more effective than the other in the etiology of gingival recessions. The same results were obtained by other authors as well [29]. However, they do not correspond with the results of other authors [1,4,28].

Also, in the results of our research, when it comes to the connection between gingival recessions and the type of toothbrush, we found that out of the total of 946 teeth with no recession present, 28 of them (3,0%) used the electrical brush, 769 (81,3%) used a soft brush, 130 (13,7%) used a medium hard brush, while the remaining 19 (2,0%) used a hard brush. Out of the total of 454 teeth with recession present, 379 of them (83,5%) used a soft brush, 66 (14,5%) used a medium hard brush, while the remaining 9 (2,0%) used a hard brush (graph 3). The results do not correspond to the results of other authors [30] who concluded in their researches that the use of ultra-soft brushes significantly contributed to the prevention of the progression of gingival recessions, as well as the fact that the maximum effect of oral hygiene maintenance was achieved with the use of these brushes in class 1 recessions, as well as other authors [1,4,7]. But they do correspond with the results of authors [11,29] who also note in their researches that the types of brushes cannot be taken with certainty as an etiological factor in the occurrence of gingival recessions.

Conclusion

The occurrence of gingival recessions is connected to the occurrence of dentine hypersensitivity. Orthodontic therapy is listed as a factor in the occurrence of gingival recessions, but orthodontic irregularities should be taken into consideration here, including conditions before therapy, cooperation between the orthodontist and periodontologist, as well as certain groups of teeth. Still, there is not enough evidence suggesting that one method of brushing teeth or a type of toothbrush is more effective than the other in the prevention of the occurrence of gingival recessions. The excessive diversity of samples and methodology design in certain studies make it difficult to define ideal techniques.

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PREVALENCE OF DENTAL CARIES AND THE INFLUENCE OF SOCIO-DEMOGRAPHIC FACTORS ON ORAL HEALTH OF SCHOOL CHILDREN

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ABSTRACT

Introduction/Aim. Oral health is a key segment of general human health. The main goal of the research was to establish the prevalence of dental caries in children aged 12-15 years, as well as to determine possible risk factors contributing to the current state of oral health of this age children. **Methods.** A study was conducted in the year 2023 involving 381 children aged 12-15 from Sarajevo. Clinical examinations were conducted to identify the number of carious, extracted teeth and teeth with fillings and to determine the value of the DMFT index (decayed, missing, and teeth with fillings). Socio-demographic data were collected via survey questionnaires filled out by all respondents. **Results.** The mean DMFT index was 4.12 ± 3.361 , while the Significant caries index (SiC) was 7.93. Filling comprised the largest proportion of the DMFT index at 52.3%, followed by teeth with dental caries (41.9%). Among the participants, 211 (55.4%) were caries-free. **Conclusion.** The values of the parameter used to assess the state of oral health indicate poor oral health of children aged 12-15 years. Age, gender, mother's level of education and the area of residence of the subject emerged as significant predictors of the DMFT index. The increased proportion of teeth with fillings indicates moderate awareness of oral health importance. It is necessary to motivate school children about the importance of oral health while developing preventive programs that are key to improving oral health.

Key words: oral health, dental caries, DMFT index, SiC index

Introduction

Impaired oral health represents a significant public health concern, considering its potential to cause major consequences and impact to overall well-being. Oral diseases represent the most widespread diseases on a global level. According to its incidence, oral diseases are just behind the diseases of the upper respiratory tract and diarrheal syndromes within the 3rd category of diseases on the Global Burden of Diseases list for 2019 (GBD). According to the prevalence, untreated dental caries of permanent teeth in school children stands out as the predominant disease of the 4th category of the Global Burden of Diseases list [1,2,3]. The onset of oral diseases in childhood, especially dental caries, can result in tooth loss, impair the chewing condition and function and increase the risk of chronic non-communicable diseases over the lifespan [4,5]. More developed European countries have recorded a decrease in the prevalence of caries among the population in recent years, while the situation remains unsatisfactory in Eastern European countries, including Bosnia and Herzegovina [6].

The influence of socio-demographic factors on the occurrence and progression of dental caries in children is particularly interesting [7]. This research has indicated that children living in rural areas often exhibit a higher prevalence of dental caries compared to their peers from urban areas [8]. It has also been established that the level of parents' education represents an important factor in children's oral health, where children whose parents possess a higher level of education demonstrate a lower incidence of dental caries [9]. While gender does not appear to be an important factor influencing the occurrence of dental caries according to some research, it has been established that the DMFT index tends to increase with age [8,10]. The socio-economic status of the family influences the prevalence of dental caries in a such manner that children from families with a higher socio-economic status show a lower prevalence of dental caries [11].

In the past decade, research focusing on the assessment and analysis of oral health parameters among school-aged children in Bosnia and Herzegovina has been scarce, resulting in a lack of data on children's oral health, hindering the development of

suitable approaches to enhance the status of oral health [12,13,14]. In this regard, this research aims to determine the prevalence of dental caries among school-aged children and define possible risk factors influencing the current state of oral health of children of this age.

Methods

The research was conducted as an epidemiological, observational study involving school-aged children in the Sarajevo Canton. Approval for the study was obtained from the Public Health Centre and the Centre for Education and Scientific Research (01-06-33-2-3237-2/23). A total of 381 school-age children (184 boys and 197 girls, average age 13.34 ± 1.073) were included in the study. The Scalex SP calculator was used to determine the required sample size, using an assumed prevalence of dental caries in school-aged children of 55%, a margin of error of 5% (0.05), and a level of confidence of 95% [15,16,17]. Throughout the study, adherence to the principles of good scientific and professional practice and compliance with the Declaration of Helsinki was maintained. Parents or guardians of children were informed about the nature of the research, data collection procedure and other aspects of the study through informative materials. Only children whose parents or guardians provided written consent to use the personal data for research purposes were included in the study process.

All subjects underwent dental examinations in the dental practice of the Public Health Centre, following the criteria set by the World Health Organization (WHO) for epidemiological research in oral health. The procedures were conducted using artificial lighting, a flat dental mirror and the WHO periodontal probe (CPI) [18]. Clinical examinations of all subjects were carried out by a single dentist (the author of the paper). The objective was to determine the values of the parameter used to assess oral health, namely the DMFT index. According to WHO methodology, the DMFT index represents the average sum of carious, extracted and filled teeth. Additionally, based on the DMFT index, the Significant Caries Index (SiC index) was calculated. The SiC index reflects the average DMFT index value among one-third of the subjects with the highest

DMFT index values [18]. To ensure the reliability of the researcher, the kappa statistic was applied. The reliability of the researcher was tested on 10% of the total sample to obtain high inter-observer reliability in diagnosing dental caries. In addition to the dental examination, all children were surveyed using a specially designed questionnaire conducted in the form of an interview. [18]

This questionnaire was recommended by the WHO for research purposes and contains questions to obtain the data on socio-demographic characteristics of the children [18].

The data obtained from this research were analyzed using SPSS PASW Statistics program 18.0, as well as STATA for Windows. The results were further analyzed using descriptive statistical analysis, Kruskal Wallis, Mann-Whitney U test, regression models and binary logistics regression. A significance level of $p < 0.05$ was considered statistically significant. Considering the sample size, the Kolmogorov-Smirnov test was used to test the normality of the distribution of variables.

Results

The sample involved 381 school children, aged 12-15, consisting of 184 boys and 197 girls. The average age of the children of the observed children was 13.34 ± 1.073 (median=13, range=12-15). The socio-demographic characteristics of the participants are detailed in Table 1. The presence of dental caries was observed in 44.6% of respondents. Based on the analysis, the mean DMFT index was 4.12 ± 3.361 , while the value of the SiC index was 7.93. Fillings constituted the largest proportion of the DMFT index (52.3%) followed by decayed teeth (41.9%), and extracted teeth (5.8%) (Table 2).

Kruskal-Wallis and Mann-Whitney U tests revealed statistically significant differences in the values of the DMFT index across the following socio-demographic characteristics: area of residence, father's level of education, mother's level of education and mother's employment status.

A statistically significant difference was observed in the value of the DMFT index among respondents from urban (2.94 ± 2.809), peri-urban (4.88 ± 3.556) and rural areas (6.00 ± 3.260).

When it comes to parents' education levels, a statistically significant difference in DMFT index

| Characteristics | Respondents n (%) |
|--|-------------------|
| Gender | |
| Male | 184 (48.3%) |
| Female | 197 (51.7%) |
| Area of residence | |
| Urban area | 202 (53.0%) |
| Peri-urban area | 89 (23.4%) |
| Rural area | 90 (23.6%) |
| Father's education level | |
| Elementary school | 1 (0.3%) |
| High school | 260 (68.2%) |
| Associate degree or higher vocational school | 2 (0.5%) |
| University | 114 (29.9%) |
| Without a male person in the household | 4 (1.0%) |
| Mother's education level | |
| Elementary school | 6 (1.6%) |
| High school | 211 (55.4%) |
| Associate degree or higher vocational school | 2 (0.5%) |
| University | 160 (42.0%) |
| Without a female person in the household | 2 (0.5%) |
| Father's employment status | |
| Employed | 371 (97.4%) |
| Unemployed | 6 (1.6%) |
| Without father | 4 (1.0%) |
| Mother's employment status | |
| Employed | 313 (82.2%) |
| Unemployed | 66 (17.3%) |
| Without mother | 2 (0.5%) |

Table 1
Socio-demographic characteristics of participants in the study

| Parameters of DMFT | (%) | $\bar{x} \pm SD$; median (min-max) |
|---|------|-------------------------------------|
| Decay | 41.9 | 1.72 ± 2.656 ; 0 (0-20) |
| Extracted teeth | 5.8 | 0.23 ± 0.763 ; 0 (0-5) |
| Teeth with fillings | 52.3 | 2.15 ± 2.344 ; 2 (0-10) |
| DMFT | 100 | 4.12 ± 3.361 ; 4 (0-20) |
| \bar{x} - mean value, SD - standard deviation | | |

Table 2
Teeth with decay, extracted, and teeth with fillings, DMFT value

value was registered between respondents with parents holding secondary education qualifications (father= 4.80 ± 3.430 , mother= 5.38 ± 3.252) and those children whose parents had higher education qualifications (father= 2.41 ± 2.541 , mother= 2.26 ± 2.406).

| Variables | DMFT index $\bar{x} \pm SD$; median (min-max) | Significance (p) |
|--|---|---------------------|
| Gender | | |
| Male | 3.74 \pm 3.084; 4 (0 – 16) | ^a 0.056 |
| Female | 4.47 \pm 3.573; 4 (0 – 20) | |
| Area of residence | | |
| Urban area | 2.94 \pm 2.809; 2 (0 – 12) | ^b 0.000* |
| Peri-urban area | 4.88 \pm 3.556; 4 (0 – 16) | |
| Rural area | 6.00 \pm 3.260; 5.5 (0 – 20) | |
| Father's education level | | |
| Elementary school | 6.00; 6 (6) | ^b 0.000* |
| High school | 4.80 \pm 3.430; 4 (0 – 20) | |
| Associate degree or higher vocational school | 4.00 \pm 0.0; 4 (4-4) | |
| University | 2.41 \pm 2.541; 2 (0 – 12) | |
| Without a male person in the household | 7.75 \pm 1.251; 8 (6-9) | |
| Mother's education level | | |
| Elementary school | 7.16 \pm 5.076; 7.5 (0 – 14) | ^b 0.000* |
| High school | 5.38 \pm 3.252; 4 (0 – 20) | |
| Associate degree or higher vocational school | 4.50 \pm 0.707; 4.5 (4 – 5) | |
| University | 2.26 \pm 2.406; 2 (0 – 12) | |
| Without a female person in the household | 10.00 \pm 2.828; 10 (8 – 12) | |
| Father's employment status | | |
| Employed | 4.08 \pm 3.363; 4 (0 – 20) | ^a 0.889 |
| Unemployed | 3.83 \pm 3.188; 3.5 (0 – 8) | |
| Mother's employment status | | |
| Employed | 3.79 \pm 3.260; 4 (0 – 20) | ^a 0.000* |
| Unemployed | 5.50 \pm 3.333; 4 (0 – 16) | |
| *statistically significant; a Mann-Whitney U test, b Kruskal Wallis, \bar{x} - mean value; SD – standard deviation | | |

Table 3
DMFT index distribution - children 12-15 years of age

Additionally, a statistically significant difference in the value of the DMFT index was identified between respondents with employed mothers (3.79 \pm 3.260) and those with unemployed mothers (5.50 \pm 3.333).

No statistically significant difference was observed in the value of the DMFT index regarding gender and the father's employment status (Table 3).

When analyzing the influence of socio-demographic characteristics on the DMFT index, the effects of the respondents' gender and age, area of residence and parents' education and employment were examined. All independent variables of interest, except for age, are of a qualitative type and are

incorporated into linear regression models through dummy variables representing initial categories. The result of the Ramsey RESET test ($p=0.2058$) suggests the correct functional form indicating the relationship between the dependent and independent variables. According to the White test for assessing homoscedasticity ($p=0.5347$), it is concluded that the model does not exhibit heteroskedasticity. The average variance growth factor is 1.6, indicating that the model does not have the problem of multicollinearity of independent variables.

Based on the conducted diagnostic tests, it can be concluded that the model satisfies all the key assumptions of the multiple regression model. The

| Variables | Multiple linear regression | | |
|---|----------------------------|-------|------------------|
| | +B (95% CI) | SD | Significance (p) |
| Age | 0.555 | 0.140 | 0.000* |
| Gender – male | -0.646 | 0.258 | 0.031* |
| Area of residence – urban | -1.275 | 0.469 | 0.007* |
| Area of residence – periurban | -1.134 | 0.437 | 0.010* |
| Father's education level – university education | -0.387 | 0.437 | 0.377 |
| Mother's education level – university education | -2.402 | 0.477 | 0.000* |
| Father's employment status – employed | -0.133 | 0.948 | 0.889 |
| Mother's employment status - employed | -0.057 | 0.429 | 0.895 |

*statistically significant; +unstandardized coefficient B; CI – confidence interval; SD – standard deviation

Table 4
Multiple linear regression for DMFT index

adjusted R-squared value is 0.2622, indicating that 26.22% of the variation in the DMFT index variable can be explained by the variation of the independent variables included in the model.

All predictors included in the model, except for the father's education level and the employment status of both parents exhibit a statistically significant effect on the DMFT index. These predictors serve as risk factors and have a significant impact on oral health indicators.

It was determined that for each additional year of age, the average DMFT index value increases by 0.55. On average, male respondents have a DMFT index 0.6 lower than female respondents. Respondents from urban and peri-urban areas exhibit, on average, DMFT index values of 1.27 and 1.13 lower than respondents from rural areas, respectively. Additionally, respondents whose mothers have attained a higher education level demonstrate, on average, a DMFT index 2.40 lower compared to respondents whose mothers have completed high school (Table 4).

To assess the impact of selected independent variables on the likelihood of respondents falling into the category with the highest DMFT index (SiC) values, a logistic regression model was evaluated.

Based on the likelihood ratio test (p=0.000), it is evident that the evaluated model is statistically significantly superior to the empty model. McFadden's pseudo-R2 is 0.1696. The model specification was examined using the linktest. It is

shown that $\hat{\beta}$ is statistically significant (p=0.000), while $\hat{\beta}_{sq}$ is not statistically significant (p=0.287), affirming the correct specification of the model. The multicollinearity of the regressor variables was previously confirmed for the multiple linear regression case. The percentage of correct predictions based on the evaluated binary logistic model was also calculated and it is 72.70% for the model as a whole, while the sensitivity of the model is 53.44% and the specificity is 82.80%. With the key assumptions of the logistic regression model being satisfied, the statistical significance of the coefficients in the model was interpreted.

The age of respondents and their mother's education level have a statistically significant effect on the likelihood of ending up in the SiC category of respondents.

Since the value of the coefficients in the evaluated logit model is interpreted as changes in odds ratios, average marginal effects were calculated for greater interpretability.

Based on the obtained marginal effects for statistically significant variables, it is deduced that with each additional year of age, the probability of ending up in the SiC category increases by an average of 6.67%. Moreover, the respondents whose mothers have achieved a high (university degree) level of education have, on average, a 30.22% lower probability of being in the SiC category compared to respondents whose mothers have completed high school at most. Consequently, the odds of ending up

| Variable | Binary logistical regression | |
|---|------------------------------|------------------|
| | *OR (CI) | Significance (p) |
| Age | 1.449 (1.146-1.832) | 0.002* |
| Gender – male | 0.746 (0.462-1.204) | 0.230 |
| Area of residence – urban | 0.628 (0.315-1.250) | 0.185 |
| Area of residence – peri-urban | 0.556 (0.296-1.043) | 0.067 |
| Father's education level – university education | 0.555 (0.245-1.258) | 0.159 |
| Mother's education level – university education | 0.187 (0.84-0.413) | 0.000* |
| Father's employment status – employed | 0.542 (0.135-2.176) | 0.388 |
| Mother's employment status - employed | 1.544 (0.842-2.831) | 0.160 |
| *Odds ratio (confidence interval) for inclusion in the SiC category per socio-demographic variables; OR – odds ratio; CI – confidence interval; *statistically significant; | | |

Table 5
Significant caries index

in the SiC category for respondents whose mothers have a secondary education are 5.3619 times higher than for respondents whose mothers have a university education (Table 5.).

Discussion

This research aimed to evaluate oral health by analyzing the DMFT index, SiC index and the prevalence of dental caries, as well as to identify socio-demographic factors with a significant impact on oral health.

The first comprehensive assessment of oral health in Bosnia and Herzegovina was conducted in 1987, revealing a DMFT index of 6.50 among twelve-year-old and 9.70 in fifteen-year-olds. In subsequent research conducted a year later, Vrbic reported a DMFT index value of 6.1 in 12-year-olds[19].

In this research, the DMFT index value was 4.12. According to WHO criteria, this value ranges between the moderate and high values of this index [20]. The significant disproportion between the obtained DMFT value and the WHO-recommended value for European countries is concerning, underlining the significance of the issue. Moreover, the WHO has set a goal for the DMFT index in Europe not to exceed 1.5

by the year 2020 [21]. The DMFT index values among the school children across the European Union member countries are often below 2, and in certain countries even below 1 [20,22]. This indicates varying trends in oral health and underscores the possibility for improvement for regions with higher DMFT index values. However, the recorded DMFT index value aligns with the earlier research, which has classified the Eastern European region as having a high risk, based on DMFT index values, with an average index value of 4.1 [22,23].

However, the determined DMFT index value demonstrates a moderate decrease compared to previous research conducted in Bosnia and Herzegovina. According to the latest studies, the DMFT index among school children was 7.18, whereas earlier research in 2013 indicated a DMFT index of 4.2 for twelve-year-old and 7.6 for fifteen-year-olds [24,25]. Another study conducted in Bosnia and Herzegovina in 2014 reported a DMFT index value of 4.16 for twelve-year-olds[14].

Contrary to previous research conducted in Bosnia and Herzegovina and the region, it was established that teeth with fillings have a majority share in the DMFT index [14,25,26]. The relatively high representation of teeth with fillings (52.3%) in

the DMFT index suggests a likelihood of moderate motivation among the subjects and a somewhat developed sense of oral health preservation. Additionally, it could also indicate the presence of an efficient healthcare system.

As anticipated, the determined value of the SiC index is significantly higher than the DMFT index. It has been observed that there is a subset of subjects in the sample with a DMFT index value notably greater than the average value of the DMFT index of the entire sample. Considering the global objective to achieve a SiC index value of 3.0 by the end of 2015., the obtained SiC index from this study (7.93) indicated unfavorable trends at the local level [27]. This value resembles the SiC index value obtained from national research on oral health in twelve-year-olds in Bosnia and Herzegovina [28], showing a substantial portion of the population with higher DMFT index values than the average.

The prevalence of dental caries in school children in this research was 44.6%, indicating a decrease compared to similar studies conducted earlier in Bosnia and Herzegovina [24, 28]. This value is slightly lower than the prevalence of dental caries in school children being around 52% in nine European countries [29], and lower than the prevalence of dental caries in school-aged children at a global level (53.8%), as reported in a conducted meta-analysis [30].

A significant aspect of this research focused on identifying the predictors or risk factors for a higher DMFT index in school children. This research has established that the age of the subjects has an impact on the DMFT index being consistent to the findings from research conducted by Moca et al. [10]. Likewise, the educational level of the mother emerged as a significant predictor of the DMFT value in school children. Similar observations were reported by Nebhwani, who found out that a higher level of education of the mothers correlates with increased awareness of the importance of oral health corresponding to the results obtained by Kamiab et al. [31,32].

Throughout the research, it has been determined that the subjects living in an urban environment have significantly lower DMFT values, compared to the subjects from peri-urban and rural environments. These findings are consistent with the conclusions of Perić et al., who determined that the number of

carious and extracted teeth increases when moving from an urban to a rural environment [33]. One possible explanation for such an increase in the DMFT index could be connected with the reduced availability of healthcare services in rural areas compared to urban areas, as well as lower levels of awareness of children and their parents on the importance of oral health [9].

Although the mother's employment status has been identified as a significant predictor of dental caries occurrence in previous research, with employment having a negative impact on dental caries prevalence, in this study involving children aged 12-15, the mother's employment status was not identified as a statistically significant predictor of higher DMFT index and dental caries [34].

Conclusion

The results of the research show similar trends in the average DMFT index value compared to studies conducted in the region. However, considering all the research conducted since 1987, a positive shift in this regard was observed, although Bosnia and Herzegovina still lags behind the developed European countries. While many developed countries have recorded significant improvements in children's oral health, Bosnia and Herzegovina still falls short of meeting the objectives of the World Health Organization's "Health 21" strategy for Europe. It was found that socio-demographic factors influence the oral health of school children.

Therefore, it is imperative to initiate a campaign focusing on a curative approach to reduce the population affected by this disease. Simultaneously, preventive measures and activities aimed at raising awareness among both children and their parents about the importance of oral health must be implemented. These efforts are essential for achieving overall, long-term and sustainable improvement of children's oral health.

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ASSOCIATION OF STRESS AND SYMPTOMS OF TEMPOROMANDIBULAR DISORDERS IN STUDENTS

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ABSTRACT

Objective: Investigate the prevalence of symptoms of temporomandibular disorders (TMD) and their association with perceived stress among students.

Material and Methods: The sample included 139 students of the third, fourth, fifth and sixth years of the Faculty of Dentistry University of Sarajevo. Students filled out two questionnaires in person and electronically which were anonymous. The Fonseca anamnestic index was used to assess the presence of TMD, and the second questionnaire is the Perceived Stress Scale (SPS) referring to the presence of existing stress and its level in the last month.

Results: The average values of the total TMD score indicate the presence of mild TMD within each group of students. A moderate level of SPS was most often present in students in the fourth year of study, while a high level of stress was most often present in students in the third year of study. ANOVA showed no differences in the average values of the TMD and SPS scores between the examined groups ($p < 0.220$; $p < 0.745$). There is a correlation between perceived stress and TMD symptoms in third ($r = 0.466$; $p < 0.004$) and sixth year students ($r = 0.418$; $p < 0.016$).

Conclusion: TMD and perceived stress were present in students at all years of study. The frequency of TMD symptoms and the level of perceived stress were different in all years of the study. Students of the third and sixth year of study who had a higher level of perceived stress also had a significantly higher prevalence of TMD.

Keywords: TMD, perceived stress, Fonseca anamnestic index

Introduction

Temporomandibular disorders (TMD) include a numerous of clinical conditions related to temporomandibular joint (TMJ), masticatory muscles and the adjacent tissue structures. These conditions are characterized by pain in temporomandibular joints and/or muscles, restricted mandible movements and sounds (clinking and crepitations) in joints during mandible function. Headache and tinnitus can also be present [1,2]. As for general population the prevalence of TMD is 31% while in children and adolescents it is 11% with a dominant presence of dislocation of discus articularis with reduction [3]. It is considered that temporomandibular disorders are the main cause of odontogenic and orofacial pain. The pain caused by TMD can be transferred to various regions such as the upper and lower jaws, the area of the ear, eye and forehead, cervical regions of the spine or the upper parts of the shoulder [4]. The TMD etiology is multifactorial where functional, structural and psycho-social factors can be a cause, either individually or in a combination. Most commonly these are direct or indirect traumas, parafunctional habits and stress. The perceived stress, anxiety, depression and sleeping disorder are risk factors in the emergence of TMD. Stress is conducive to increased muscle activity and the appearance of pain. [5,6]. Academic commitments, high educational and social standards in students can result in sleeping disorder and psychological stress that can contribute to TMD [5,7,8]. Stress affects the quality of life and it is correlated with many pathological conditions. Chronic stress affects health, immune, cardiovascular, endocrine and central nerve systems. Unless chronic stress is not treated, it can cause insomnia, high blood pressure and thus damage the mental health of an individual [9-11].

Fonesca Anamnestic Index (FAI) was developed to examine the prevalence and the estimate of seriousness of TMD, based on signs and symptoms with a high degree of diagnostic accuracy [12-14]. The Scale of Perceived Stress (SPS) is a broadly used instrument for measuring stress. SPS evaluates to what extent an individual has experienced life as unpredictable, uncontrollable and overloaded, but also to what extent the external factors have influenced an individual and his ability to deal with

them [15]. Since TMD has a multifactorial etiology and various symptoms and signs, its diagnosis and treatment are made more difficult. There is no data about the symptom prevalence of TMD nor about its correlation to stress in our student population.

Taking into account an increasing prevalence of stress in younger people as well as symptoms and signs of TMD, it becomes necessary to research their correlation in students with the aim of prevention and appropriate therapy [16-19]. The aim of this research was to examine the prevalence of TMD symptoms and their correlation with perceived stress in students of the Faculty of Dentistry University of Sarajevo.

Subjects and methods

In this research the sample consisted of 139 students of the Faculty of Dentistry University of Sarajevo. The students were given detailed explanations about the research, the questions were clearly formulated and the students themselves gave their consent to participate. The participation in this research was voluntary. The Ethical committee of the Faculty of Dentistry University of Sarajevo issued its approval of this research under no: 02-3-4-19-1-10/2022. Distribution of students was as follows: 36 third-year students, 40 fourth-year students, 30 fifth-year students and 33 sixth-year students. The students received two questionnaires in person and via email to fill in anonymously. The students were asked to fill in the Fonesca Anamnestic Index (FAI) questionnaire and the questionnaire of the perceived stress (PSS).

Fonesca Anamnestic Index consists of 10 questions with three possible answers: "yes" (10 points), "sometimes" (5 points) and "no" (0 points). By adding all points, it is possible to classify the seriousness of TMD, the absence of symptoms and signs from 0-15 points, mild disorders from 20-45 points, moderate disorders from 50-65 points and severe disorders from 70 to 100 points [6,13,20]. The scale of perceived stress (SPS) consists of 10 questions regarding the presence of existing stress and its level in the last month. Each question is marked on the scale from 0-5 points which are graded as follows: 0-never, 1-almost never, 2-

sometimes, 3-often, 4-quite often. The points for questions 4,5, 7, 8 in this questionnaire have been changed so that they are calculated as 0=4, 1=3, 2=2, 3=1, 4=0. The final result is obtained by adding all points which can be in the range from 0-40 points. The results can be interpreted as follows: the range from 0 - 13 points - low level of stress, from 14 - 26 points - moderate level of stress and the range from 27- 40 points - highly perceived stress level [15, 21, 22]. In the course of SPS questionnaire filling in the aim was to test students about their feelings and thoughts in the past month. The students were asked how often they felt or thought in a certain way. In general, they were supposed to give the best possible answer in that specific situation.

Statistical methods of data analysis

Statistic data analyses were implemented in IBM SPSS Statistics v.22 software. With regard to descriptive statistic parameters arithmetic mean, standard deviations and min-max value range on quantitative variables were calculated followed by absolute and relative prevalence on nominal variables. As for parametric statistical methods One Way ANOVA was used for comparison of independent groups, while for the research of correlation between variables Pearson's Linear Correlation was applied. Research hypotheses were tested at alfa level of reliability from 95%.

Results

In this research the total of 139 subjects from different years of studies was included. The distribution of subjects according to the year of studies was presented in Table 1. The fourth-year students had the highest mean value of score for the presence of symptoms and signs of TMD, namely $29,8 \pm 19,8$ (Mean \pm SD), while the third-year students had the lowest value of score, i.e. $20,7 \pm 16,1$ (Table 2.). The highest mean score value of perceived stress was shown by third-year students ($18,6 \pm 5,9$) and fourth-year students ($18,1 \pm 4,7$), while the lowest level of stress was shown by the subjects from the fifth year of studies ($17,5 \pm 3,6$) and the sixth year ($17,4 \pm 5,5$),

| Year of studies | n | % |
|----------------------|-----|------|
| 3 rd year | 36 | 25,9 |
| 4 th year | 40 | 28,8 |
| 5 th year | 30 | 21,6 |
| 6 th year | 33 | 23,7 |
| Total | 139 | 100 |

Table 1

Number of subjects according to year of studies

| Year of studies | Total score - TMD | | | |
|----------------------|-------------------|--------------------|---------|---------|
| | Mean | Standard Deviation | Minimum | Maximum |
| 3 rd year | 20,7 | 16,1 | 0 | 70 |
| 4 th year | 29,8 | 19,8 | 0 | 80 |
| 5 th year | 24,5 | 17,5 | 0 | 70 |
| 6 th year | 27,0 | 22,8 | 0 | 95 |

Table 2

Mean values, variables and value range of total TMD score

| Year of studies | Total score - Scale of perceived stress SPS | | | |
|----------------------|---|--------------------|---------|---------|
| | Mean | Standard Deviation | Minimum | Maximum |
| 3 rd year | 18,6 | 5,9 | 8 | 30 |
| 4 th year | 18,1 | 4,7 | 6 | 26 |
| 5 th year | 17,5 | 3,6 | 0 | 24 |
| 6 th year | 17,4 | 5,5 | 0 | 31 |

Table 3

Mean values, variables and value range of total SPS score

which is shown in Table 3. The prevalence of TMD level related to the year of studies was presented in Graph 1. Mild disorders were most commonly shown by subjects from the third year (30%). Moderate

| | Year of studies | n | Mean | SD | F | p |
|---|----------------------|----|-------|-------|-------|-------|
| Total score - TMD | 3 rd year | 36 | 20,69 | 16,13 | 1,490 | 0,220 |
| | 4 th year | 40 | 29,75 | 19,81 | | |
| | 5 th year | 30 | 24,50 | 17,54 | | |
| | 6 th year | 33 | 26,97 | 22,77 | | |
| Total score – Scale of perceived stress | 3 rd year | 36 | 18,61 | 5,92 | 0,412 | 0,745 |
| | 4 th year | 40 | 18,08 | 4,72 | | |
| | 5 th year | 30 | 17,50 | 3,62 | | |
| | 6 th year | 33 | 17,42 | 5,51 | | |

n – size of sample, Mean- arithmetic mean, SD-standard deviation F- Fisher test (ANOVA), p-probability of zero hypothesis rejection with 5% risk

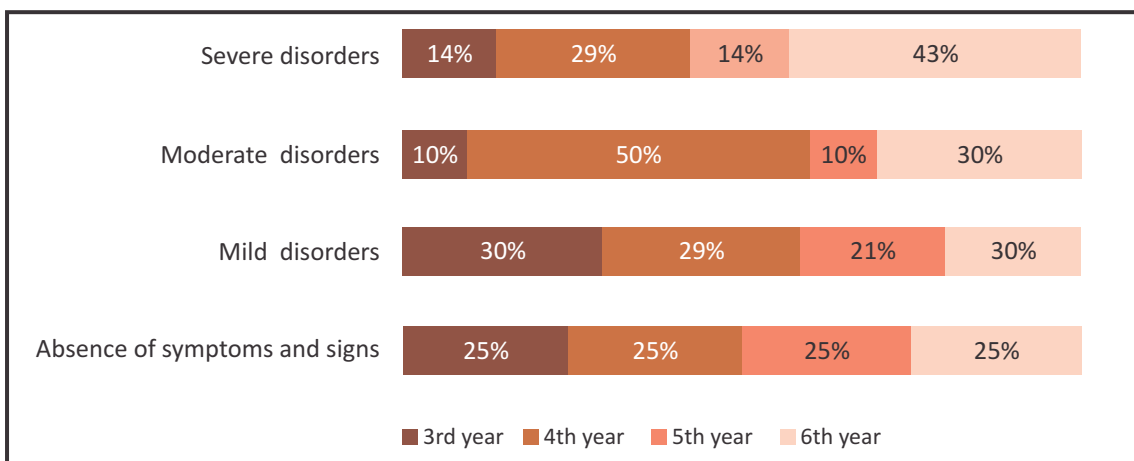
Table 4
Comparison of TMD and SPS levels in subjects between years of studies

disorders were most commonly used by subjects from the fourth year (50,0%), while the highest percentage of severe TMD was shown by the subjects from the sixth year. With regard to the prevalence of perceived stress (SPS) in students according to the year of studies (Graph 2.) it was ascertained that the moderate stress level was most commonly present in the fourth-year students while the biggest percentage of high stress level was present in the third-year students (83,3%). By one way analysis of variance of independent samples the differences in mean values of TMD level and SPS were tested in subjects from different years of studies. The analysis of variance has not proved the statistical significance among groups TMD $p < 0,220$; SPS; $p < 0,745$. (Table 4.). The association between perceived stress and TMD symptoms for subjects from each year of studies was researched by using Pearson's linear correlation. There is a correlation between perceived stress and

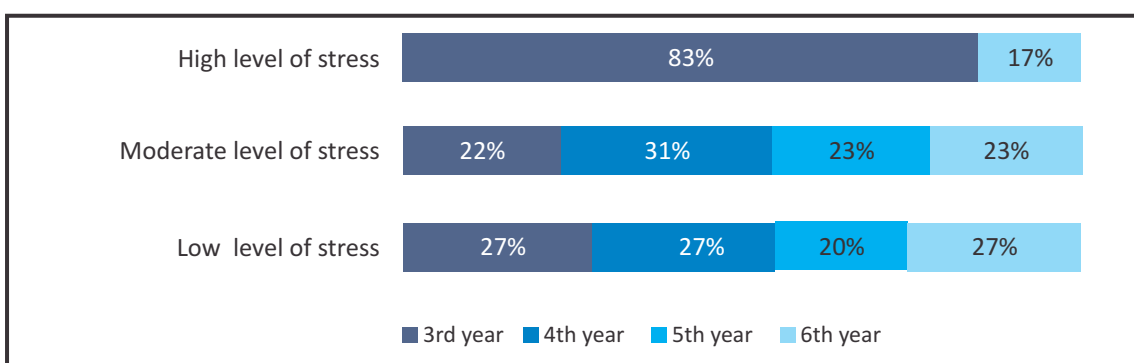
TMD symptoms in third ($r = 0.466$; $p < 0.004$) and sixth-year ($r = 0.418$; $p < 0.016$) students confirmed by realized mean positive coefficients of Pearson's linear correlation shown in Graphs 3. and 4.

Discussion

Etiology of TMD is not clearly differentiated and as such it is considered multifactorial. Among all potential causes of TMD the behavioral and psychological factors are considered as most significant in etiology. As for student population, particularly in medical schools or health related faculties, a great number of studies indicates that in general those students have higher levels of perceived stress than their peers in general population [23-25]. The results of this research have



Graph 1
Prevalence of level of TM disorders according to the year of studies of subjects



Graph 2
Prevalence of the level of SPS disorder according to the year of studies of subjects

shown that the mean values of the total score of TMD indicate the presence of mild TM disorders in all groups of students. The highest values were present in fourth-year students, then sixth year and fifth-year students while the lowest mean value of TMD score was present in third-year students (Table 2.). The highest mean value of the total score of SPS was shown by the subjects of the third and fourth year of studies while the lower stress level was shown by the subjects from the fifth and sixth year of studies of the Faculty of Dentistry University of Sarajevo (Table 3.).The explanation for these results lies in the fact that third-year students are faced for the first time with a dental workplace while perceived stress in fourth-year students indicates their fear of new challenges in the clinical work with patients. TMD symptoms were present in students from all years of

studies. In view of prevalence mild TMD were most commonly shown by subjects from the third year, moderate TMD were shown by fourth-year students while severe TMD were shown by sixth- year students (Graph 1.) Out of the total number 25% of students in each group have not shown the presence of TMD.

The previous study examined the presence of TMD in 212 students using Fonesca Anamnestic Index and correlated risk factors while for the estimate of the stress level of SPS the results have shown that the subjects had mostly mild TMD (60,5%), and only 4,6% with a severe TMD.

The subjects with TMD had 1,15 times higher perceived stress than those without TMD [26] which is in accordance with the results of this research. The

high stress level in this research has been shown only by third and sixth-year students (Graph 2.). Stress is an important risk factor for the emergence and persistence of TMD in students of dental medicine. The source of stress correlated with the study of dental medicine pertains to the specific nature of job, preclinical and clinical work with patients and the successful outcome. Many studies have proved that students with higher stress level have a higher prevalence of TMD symptoms and signs

[5,8,17,19,27]. This research has proved the positive correlation between perceived stress and TMD symptoms in third and sixth-year students. The third and sixth-year students with a high stress level had a significantly higher prevalence of TMD.

The previous study including 586 students registered the presence of TMD and perceived stress and thus proved their correlation which is in accordance with this research. The results have shown the highest percentage of mild disorders up to 50 %, then moderate disorders and 5,5% of severe disorders. In this research the third and sixth-year students have shown a severe TMD and a high level of stress. This can be explained by their awareness of responsibility inherent to this profession, but also the uncertainty after the completion of studies. Many studies have proved the correlation between stress, anxiety, depression and TMD with stress causing changes such as the increased muscle activity [29-34]. It is important to evaluate stress in students because it impacts their academic success and can also influence their perception and decision making. High stress level can lead to anxiety and depression, and because of that, it is vital to recognize the presence of stress in order to act in a preventive manner, establish an early diagnosis and carry out appropriate therapy.

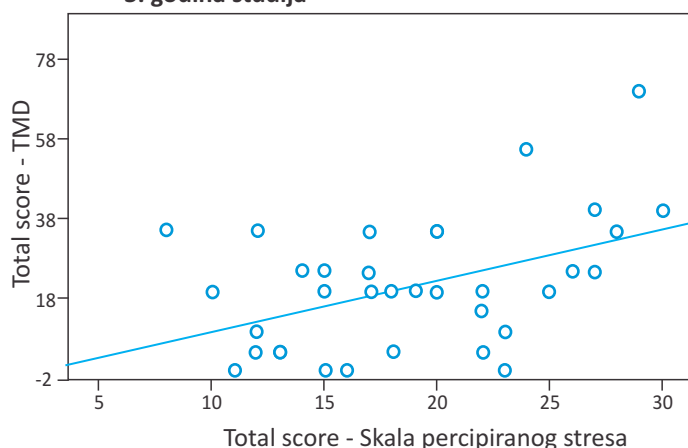
The limitation of this study is a small sample indicating a need for research that would include a bigger sample regarding stress perception and TMD presence in students from other faculties of dental medicine and medicine in Bosnia & Herzegovina in order to create legitimate foundations for comparison of the results with other faculties.

Conclusion

TMD and perceived stress were present in students from all years of studies. The prevalence of TMD symptoms and the level of perceived stress were different with regard to a particular year of studies. The students from the third and sixth year who had a higher level of perceived stress also had higher prevalence of TMD symptoms.

There is no conflict of interest.

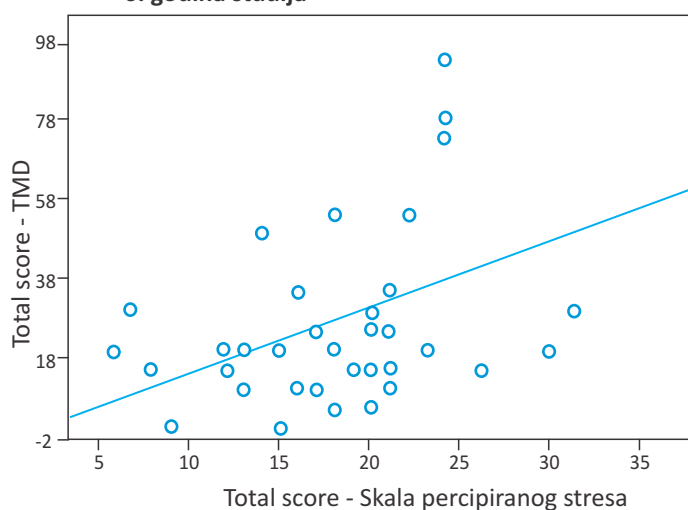
3. godina studija



Graph 3

Correlation of TMD score and the Scale of perceived stress in third-year students

6. godina studija



Graph 4

Correlation of TMD score and the Scale of perceived stress in sixth-year students

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DIAGNOSTIC AND THERAPEUTIC APPROACH TO A PATIENT WITH CLEIDOCRANIAL DYSPLASIA - DENTAL ASPECT

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ABSTRACT

Cleidocranial dysplasia (CCD) is a rare autosomal dominant congenital syndrome occurring in approximately one in every million individuals worldwide, primarily affecting bones undergoing intramembranous ossification. Individuals with CCD exhibit hypoplasia or aplasia of the clavicles, open fontanelles and shorter stature, along with various forms of dental abnormalities. The gene RUNX2 plays an essential role in odontoblast and osteoblast differentiation, regulating the expression of many genes associated with the development of hard dental tissues. CCD is this accompanied by characteristic dental abnormalities such as supernumerary teeth, delayed eruption and impaction of permanent teeth. Intrafamilial variations of skeletal and dental abnormalities are well-known.

The aim of this study is to present a clinical case and provide a diagnostic approach as a guide for practicing dentists, thereby facilitating their future work with these patients.

Keywords: impacted teeth, supernumerary teeth, dental anomalies, cleidocranial dysplasia.

Introduction

Cleidocranial dysplasia (CCD), also known as Marie-Sainton's disease, is an autosomal dominant genetic disorder. Within members of a single family, there can be various clinical presentations of this syndrome [1]. The estimated prevalence of CCD is one in a million births, with no gender predilection [2, 3]. The clinical presentation varies from classic CCD, characterized by the triad of symptoms: delayed closure of the cranial sutures, hypoplastic or aplastic clavicles and dental anomalies which can be milder with isolated dental anomalies in the absence of skeletal abnormalities [4]. The spectrum of anomalies is wide and may encompass patients with only dental anomalies and clavicular anomalies to individuals with severe skeletal developmental defects.

Individuals with cleidocranial dysplasia may also have many other systemic disorders such as defects of vertebral bones in the cervical and thoracic regions, scoliosis/lordosis, defects of the pelvic region, supernumerary ribs and defects of hands, bones and joints [2, 5]. Dental anomalies include supernumerary retained deciduous teeth, teeth with delayed eruption, impacted permanent teeth and supernumerary permanent teeth [6, 7] being the characteristic of CCD. Dental anomalies are easily detected on panoramic radiographs, and for greater precision, computerized tomography (CBCT) can be used [8]. Specifically, CBCT allows for the assessment of precise locations of supernumerary teeth and their relationships with other teeth and important anatomical structures, which is particularly useful in treatment planning.

Advanced diagnostic methods during pregnancy can also indicate CCD. CCD can be suspected at an early age, even during fetal life, through prenatal ultrasound examination [9]. Genetically, CCD is caused by a mutation in the gene encoding the osteoblast-specific transcription factor, RUNX2, located on chromosome 6p21, which consists of a region of 223 kb (Chr6:45328317-45551082) and comprises eight exons [10, 11, 12]. Chromosome 6p21 is responsible for skeletal morphogenesis and also for the differentiation of specific cells such as osteoblasts [13]. RUNX2 is crucial for the proliferation of cells specialized in bone and tooth

synthesis, as well as for osteoblast proliferation [14, 15, 16]. Mutations in the Runt domain are associated with dental anomalies such as supernumerary teeth, changes in eruption time, etc. [17].

CCD is usually diagnosed at birth but very often goes unrecognized because of its low incidence rate, and signs and symptoms are rarely seen at that age [18]. The craniofacial characteristics of the presented clinical case from our own casuistry manifest as minor skeletal changes in cranial bones and numerous impacted and supernumerary teeth. The diagnosis was confirmed after analyzing orthopantomograms and finding genetic testing results, where DNA isolation was performed using the QIAamp DNA Mini kit. The platform on which the analysis was performed is the NextSeq System Illumina allowing comprehensive analysis of more than 4800 genes.

In cases of diverse and complex dental anomalies, patients sometimes require intervention from a multidisciplinary team of dental specialists from early childhood. When treatment is approached in a timely manner with appropriate therapy provided by pediatric dentists, orthodontists, maxillofacial and oral surgeons, periodontists and prosthodontists, a harmonious dentoalveolar relationship can be achieved. [19-27]

The aim of this study is to present a clinical case and provide a diagnostic approach as a guide for practicing dentists by facilitating and providing guidelines for their future work with these patients.

Case Presentation:

A 73-year-old male patient of short stature and medium osteomuscular build presented to the reception and triage clinic of the Faculty of Dentistry with Dental Clinical Center following a referral from the Emergency Medical Services Department of the Sarajevo Canton, with a referral diagnosis of post-hemorrhagic gingivitis in the region of tooth 25. During the patient's anamnesis, we noticed that bleeding in the oral cavity occurred spontaneously during the previous night. After emergency medical intervention with gingival tamponade and intramuscular Dicynone injections, the bleeding was stopped. Further anamnestic examination of the

patient and review of medical documentation revealed that the patient had been diagnosed with osteoporosis and was receiving oral bisphosphonate therapy, medication named Promass.

On extraoral examination, we observed a shortened lower third of the face and a concave profile (Figure 1). Intraoral clinical examination revealed partial edentulism in the upper and lower jaws, limited mouth opening, high-arched hard palate, carious teeth with significant hard and soft deposits on the teeth (Figure 2).

After performing an orthopantomogram, analysis revealed twenty impacted, retained, and supernumerary teeth in both jaws (Figure 3). For more precise diagnosis, a 3D CBCT was performed, allowing for a detailed examination of tooth position and morphology, as well as their relationship with other anatomical structures in the jaws (Figure 4).

This approach facilitated the diagnosis of periodontitis et dentes supernumerarii cum impactio dentis and the development of a treatment plan.

According to the planned therapeutic protocol, the patient was first referred to the Clinic of Oral Medicine and Periodontology for the removal of supragingival and subgingival dental deposits. After obtaining the patient's medical history and analyzing radiographic images and laboratory findings (bleeding time and coagulation time), which were within reference values, initial periodontal therapy was performed, and no subsequent prolonged bleeding was observed. The patient was given instructions on maintaining oral hygiene.

After achieving optimal periodontal status, the patient was referred to the Clinic of Oral Surgery for further treatment.

Considering the analysis of OPG and 3D CBCT images revealing a larger number of impacted and supernumerary teeth, both in the upper and lower jaws, with atypical shape and position, and noting the radiolucency suggestive of a dentigerous cyst in the apical region of impacted tooth 13, a decision was made to adopt a multi-session approach to the patient's treatment protocol. After completing a detailed anamnesis, clinical examination, and radiographic diagnostics, and considering the referral diagnosis of post-hemorrhagic gingivitis in



Figure 1

Extraoral view of the patient showing a typical concave facial profile, and evident pseudoprognathism



Figure 2

Intraoral view; a. Presence of a larger number of carious teeth with hard and soft deposits; b. Hypotonic maxilla and looseness in the dental arch; c. High-positioned hard palate.



Figure 3

Orthopantomograph

the region of tooth 25, an indication for the extraction of teeth 25 and 45 was set as the primary phase of surgical treatment to address the patient's oral cavity sanitation. Additionally, before the oral-surgical procedure, an assessment was made to determine whether there was a risk of impaired healing of extraction wounds due to the patient's bisphosphonate therapy. Considering that the patient takes bisphosphonate medication orally and that the potency of the drug is not significantly pronounced due to this route of administration and

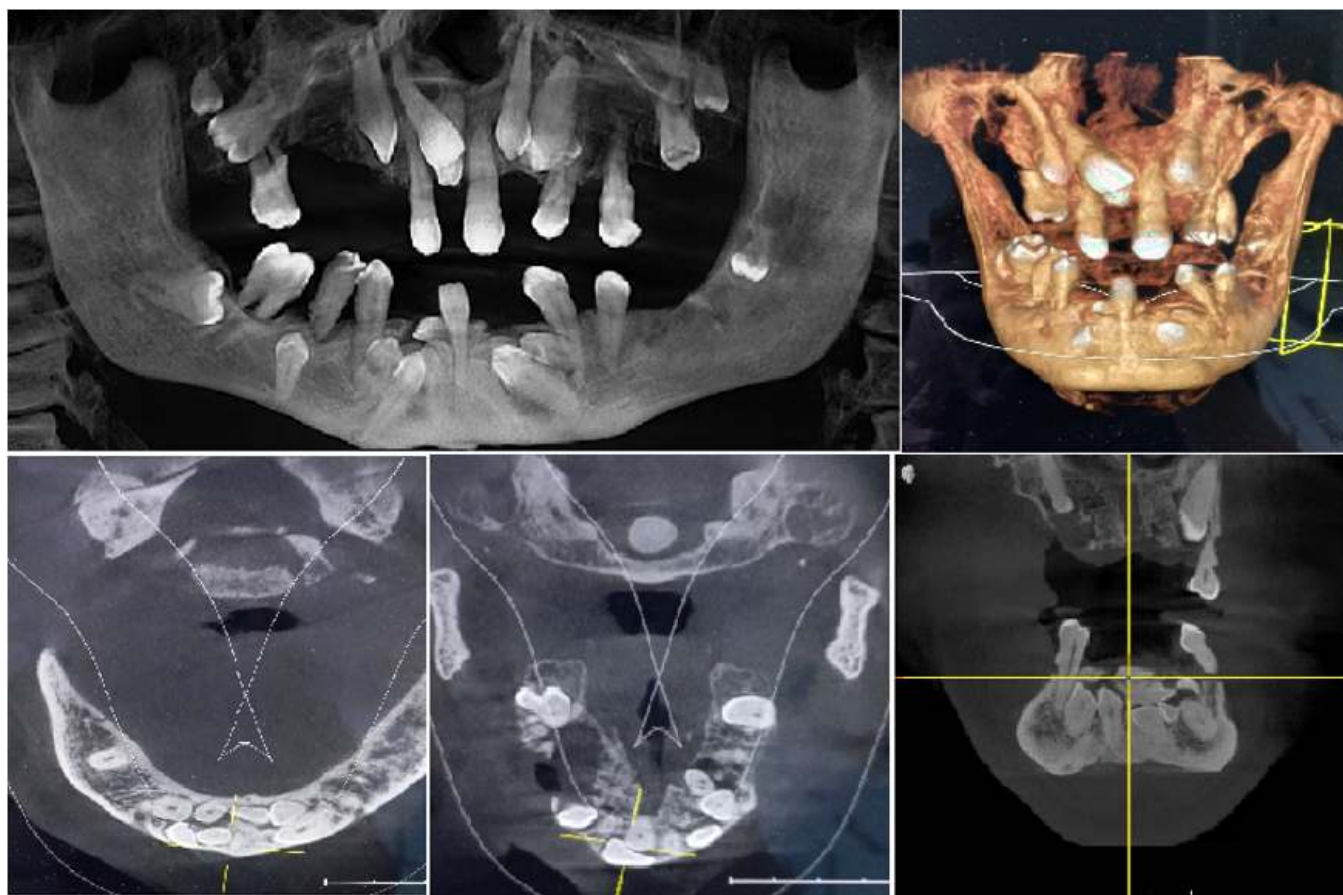


Figure 4
3D CBCT

that the patient has been on bisphosphonate therapy for less than three years, the intervention was carried out.

Under local anesthesia, tooth extraction of 25 and 45 was performed, followed by alveolar curettage, extensive wound irrigation and placement of a mattress suture in the region of tooth 25. The extraction socket in the region of tooth 45 was left to heal by secondary intention. The wound in the region of tooth 25 was primarily sutured with absorbable suture material. A broad-spectrum antibiotic (Amoxicillin caps. 500mg 2x2) was prescribed for 7 days.

The oral surgical procedure, involving tooth extraction, proceeded smoothly, with minor complaints of post-extraction pain and swelling. The extraction wounds healed well, as evidenced by follow-up examinations (Figure 5).

The patient is regularly monitored through clinical examinations and further surgical treatment planning is scheduled involving the operative removal of supernumerary and impacted teeth for which indications are set.

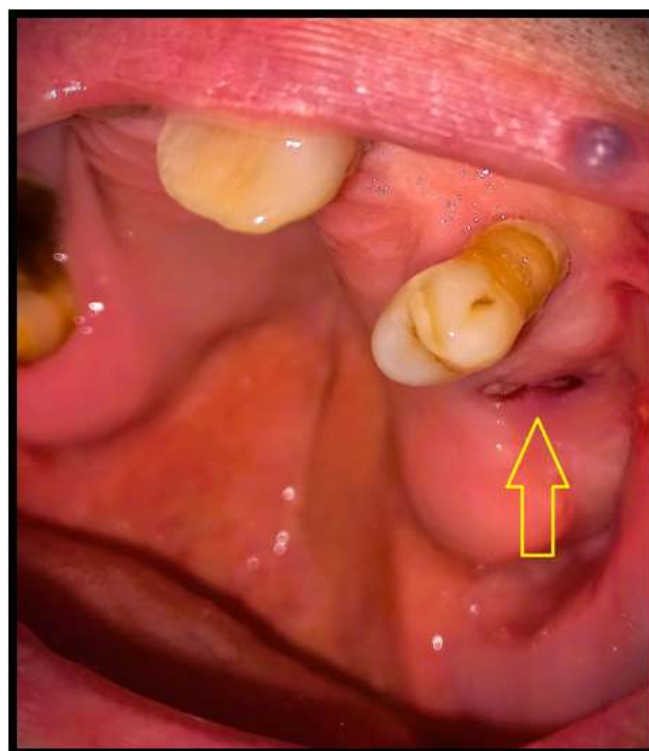


Figure 5
Normal healing of the extraction socket

Based on the extraoral and intraoral examination and suspicion of Cleidocranial dysostosis syndrome, the patient was referred for laboratory and genetic verification, confirming the existence of the mentioned syndrome.

Discussion

The most common manifestations of CCD are skeletal anomalies and atypical dentition. The most significant dental anomalies include multiple supernumerary teeth, impacted and retained teeth and the occurrence of cystic changes [17] compromising the aesthetic appearance and function of dentition [28]. The formation of supernumerary teeth can result from incomplete or delayed resorption of the dental lamina, leading to the reactivation and formation of supernumerary teeth [29]. Other dental anomalies include retention of deciduous teeth and delayed eruption with subsequent impaction of permanent teeth. Some patients, later in life, due to the need for prosthetic rehabilitation, decide to consult a dentist. Dentists often may be the first healthcare professionals to encounter patients with this potential diagnosis. The most common sites where supernumerary teeth are present include the maxillary incisor region, as well as the maxillary and mandibular canine and premolar regions [30]. The presence of supernumerary teeth can inhibit the eruption of permanent teeth and cause resorption of the roots of adjacent teeth. In our presented case, supernumerary and impacted teeth were identified in the following regions of the upper jaw: right maxillary region 18 and 17, intermaxillary region 13, 12, 11, 23, 24, 25, left maxillary region 27 and 28, and in the area of the right upper canine along with a dentigerous cyst. In the lower jaw, supernumerary and impacted teeth were identified in the following regions: in the anterior region 44, 43, 42, 31, 32, 33, 34, and in the ramus of the mandible on the left side 38 and on the right side 48.

A particularity of this case report is that the patient exhibits all the clinical characteristics of dysostosis (flat forehead, short stature, irregular relationship between the upper and lower jaws as a consequence of abnormal jaw development, etc.) and has multiple supernumerary teeth, yet there was never an expressed suspicion of CCD's presence.

For these patients, dental radiography can provide valuable diagnostic information to the dentist. Additionally, early diagnosis will increase the possibility of selecting appropriate treatment, reducing the likelihood of complications and obtaining genetic counseling for patients [1, 15]. In most cases, panoramic radiographs are often used as the initial imaging for further diagnosis, which has the specific advantages of low radiation dose and broad coverage of anatomical details of the jaws [31]. Besides assessing dentition, panoramic radiography can provide visualization of adjacent structures, such as the mandible, maxilla, zygomatic bone, and temporomandibular joints. For dentists, a significant question is whether panoramic radiography can provide a reliable assessment of CCD.

Although there are no specific therapeutic guidelines for dental treatment in patients with CCD syndrome, we believe that after the anamnestic-diagnostic procedure and suspicion of CCD syndrome, the patient should be referred for genetic analysis, which we also conducted. Osteoporosis diagnosed earlier in our patient is not associated with CCD through genetic testing. A heterozygous mutation c.2680C>T (p.Arg 894Ter) associated with Congenital Myotonia was detected, corresponding to the musculoskeletal appearance of the patient.

Therapeutic protocols depend on the patient's age, craniofacial characteristics, dental anomalies and social and economic circumstances [32]. Treatment of dental abnormalities depends on the dental and chronological age of the patient requiring a multidisciplinary approach like in our case (general dentistry specialists, periodontist and oral surgeon) with further prosthetic rehabilitation planned.

Conclusion

Based on the presented case, we can conclude that detailed anamnestic-diagnostic data (medical history, extraoral and intraoral clinical examination and radiographic analysis of orthopantomogram) can provide sufficient information for establishing a working diagnosis of CCD requiring appropriate genetic testing to confirm the diagnosis. The therapeutic protocol for dental treatment should be tailored to the patient's age with a multidisciplinary approach to treatment which may last for many years.

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ENDODONTIC MANAGEMENT OF MANDIBULAR MOLARS WITH C- SHAPED ROOT CANAL MORPHOLOGY

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ABSTRACT

This article aims to present two endodontic treatment cases of mandibular molars with C-shaped root canal morphology. Endodontic treatments of lower molars with C-shaped root canal morphology are definitely a problem in the everyday dental practice. They may represent a difficulty to every clinician and an understanding of anatomical variations of root canals and correct evaluation of preoperative radiographs are essential for achieving successful endodontic treatment outcomes. Successful endodontic treatment depends on exact access and cavity preparation, adequate shaping and cleaning followed with 3D obturation. The access cavity for teeth with a C-shaped root canal morphology varies considerably and depends on the pulp morphology of the specific tooth. Teeth with C-shaped root canal morphology pose a considerable technical challenge, and understanding of anatomical variations of root canals should be thoroughly understood for proper management and a better prognosis, use of the dental magnifications such as dental operative microscope (DOM) and dental loupes during all treatment phases are recommended. This article presents successful endodontic management of mandibular molars with C-shaped root canal morphology.

Keywords: C-shaped root canal, mandibular molar, crown down, endodontic treatment.

Introduction

Successful endodontic treatment depends on exact access cavity preparation, adequate shaping and cleaning followed with 3D obturation. This article aims to present two endodontic treatment cases of mandibular molars with C-shaped root canal morphology with symptomatic irreversible pulpitis of one case and asymptomatic apical periodontitis of another case. Usually, the mandibular molars have two roots: mesial with two canals in mesial root and distal with one canal in the distal root. [1] The mandibular molar is two rooted 67% of the time. [2, 3,] Root fusion, that becomes a single root, conical or C-shape form, has an incidence of 31%. [4] The anatomical variability of mandibular second molar is even greater than the first molar. In some cases, the molars may appear clinically and radiographically unexceptional, but in fact they have unusual canal communications, which could be found out in different phases of root canal treatment. C-shaped root canal morphology was described for the first time by Cook and Cox in mandibular second molar [5]. But it may sometimes be found in the mandibular first molar [6]. Not all C-shaped mandibular molars with C-shaped canal systems have a C-shaped pulpal floor. These canal systems are named for the cross-sectional morphology of root and root canal. This makes diagnosis difficult. However, radiographically a tooth with a C-shaped canal system always has a fused root with a longitudinal groove in the middle of the root. [7] The main cause of a C-shaped root is due to the failure of the Hertwig's epithelial root sheath to fuse on the lingual or buccal root surface. The root of molars with C-shaped root canals may be conical and fused. For these characteristics, studies suggested that C-shaped root canals could be recognized based on preoperative radiographs. However, in some cases, preoperative radiographs may remain ineffective in recognizing C-shaped canals [8]. They are mostly recognized during access cavity preparation. The complexity of the C-shaped canal system presents difficulties at shaping and obturation stages [8]. The operator must have an in-depth knowledge of the morphology of root canal system and its variations that may affect the outcome and the success of the treatment. Weine et al. have reported that present of C-shaped canal is 2.7 % of cases [9]. Instead of having three separate orifices,

the three canals have a single C-shaped one, with the convexity facing buccally [10]. Due to the higher incidence of root fusion in the mandibular molar, C-shaped canals are not infrequent. An extensive literature review by Fernandes et al. found that the incidence of C-shaped canals ranged from 0.6% to 41.3% in the Chinese population and from 31.3% to 45.5% in the Korean population. [5, 11, 12] The incidence of root fusion is generally higher in studies of Asian patients, according to Hou and Tsai incidence of fusion of 51.6% in the mandibular second molars in a Chinese population [6, 11]. Melton et al. described three categories of C-shaped canals and Haddad et al. added to the initial description [8, 13]. Category I is described as a continuous C-shaped canal from the pulp chamber to the apex. Category II is described as a "semi-colon" where one canal was separated by dentin from the C-shaped canal. The Category III, C-shaped anatomy, is described as having a C-shaped orifice with two or more distinct and separate canals [4]. Another study on mandibular molars found that there is a higher risk of root perforation at the thinner lingual walls of C-shaped canals during shaping and after canal preparation procedures. Both buccal and lingual canal walls were frequently narrower at the mesial locations [14]. The location of all root canals (RCs) and their adequate preparation, disinfection, and obturation play an important role in successful endodontic treatment (ET) [15]. The endodontic treatment needs an adequate chemically-mechanical preparation procedures and especially irrigation plays a crucial role in achieving effective disinfection and debris removal within the complex root canal anatomy [15]. Despite all of this knowledge, RC preparation and obturation is still challenging due to the variety and complexity of RCs caused by different genetics, ethnicity, gender and age, as well as the existence of lateral or accessory canals and isthmus and curvatures. [16]

Case Presentation

Before the treatments, the patients were informed that their clinical information and radiographic images may be reported in a dental magazine, and guaranteed that their names and initials will not be published. All cases were treated in the dental clinic "Dr. Berisha" in Peja.

Case 1

A 30 years old female patient presented to our clinic with a pain in the right mandibular region. The pain was spontaneous and provoked particularly at night, and the patient was required to consume analgesic to get relief from pain. The radiological and clinical examinations revealed an old amalgam filling and deep decay was observed in mesial wall of the third mandibular molar, but there was no pain to percussion, and thermal sensibility test was positive. On radiographic imaging, the periapical tissues appeared healthy with C-shaped root canal morphology. The treatment began after administering inferior alveolar nerve block anesthesia Septanest (4% Articaine hydrochloride with 1:100000 Epinephrine), (Septodont, Saint-Maur-des-Fosses Cedex, France) using Carpo syringe. Tooth 48, was with old amalgam filling and deep decay in mesial wall of tooth. (Figure 1). Based on results of clinical tests and radiographic evaluations, the patient was diagnosed with symptomatic irreversible pulpitis (SIP).

An access cavity was prepared, rubber dam was applied and three root canal orifices were localized in C-shaped canal system. Use of magnification (Univet Loupes 3.0 Spa, Rezzato, Italy) during the endodontic treatment showed helpful. The pulp tissue was removed, and the root canals were explored with size 08, and 10 K-files (Diadent, France). The patency was determined using k-file size 08 and 10. A glide path was prepared using a 10 K-file, and canal lengths were determined using an Eighteenth E-pex pro apex locator (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth, China). Root canals were prepared using with E-flex blue rotary files (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth, China) 25/04 using crown down technique. After proper working length determination, all the canals were joined at the apical third of the root. The root canals were

irrigated after each change of rotary file, with 1ml of 5.25% sodium hypochlorite solution applied to each canal following Marcus Haapasalo protocol [17]. Irriflex - flexible root canal irrigation needle (Produits Dentaires SA Vevey, Switzerland) was used. During shaping and cleaning of each canal, the operators performed irrigation of 5ml of 5.25 % sodium hypochlorite (Cerkamed, Stalowa Wola, Poland) and 2ml of 17% EDTA (Cerkamed, Stalowa Wola, Poland) for 2 min to remove the smear layer in each canal activated with ultrasonic device Ultra X. (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth, China). The drying was performed with sterile paper points. The root canal working length was controlled with rotary file and confirmed with gutta-percha radiography followed by obturation of root canals with vertical compaction and thermoplastic gutta-percha injection using Fast Pack and Fast Fill (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth, China). Guttapercha size was 25/04 (Diadent, France) in combination with Sealapex sealer (Kerr Corporation, Orange, CA, USA). Endodontic treatment was completed in one visit. The patient after the endodontic treatment, did not show any signs of discomfort or pain.

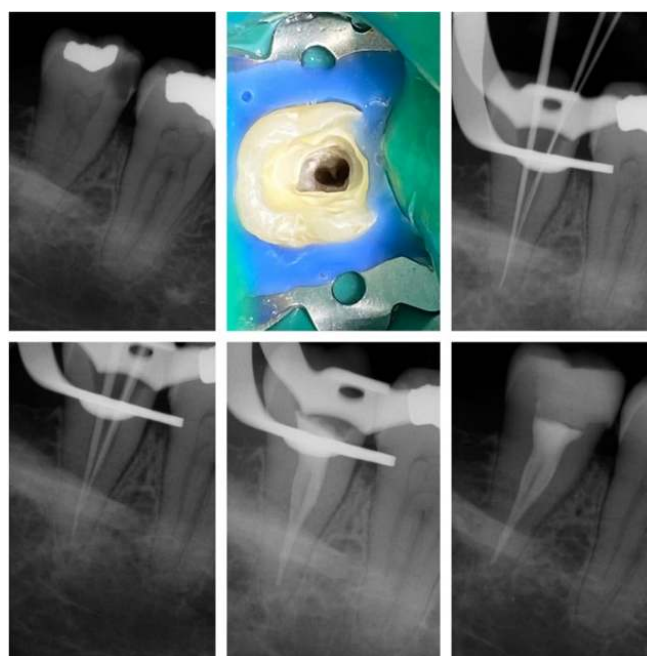


Figure 1

- A. Initial radiography;
- B. Clinical view of cavity after cleaning and shaping;
- C. Verification of working length with rotary file;
- D. Confirmation of working length with guttapercha;
- E. Radiographic image after obturation;
- F. Final radiographic image.

Case Presentation

Case 2

A 43 years old female patient presented to our clinic with a broken old composite on tooth 47 and she wants to replace it with new composite filling. She had a history of endodontic treatment from before 8 years. The tooth was asymptomatic. The radiological and clinical examinations, revealed an old broken composite filling, with no pain to percussion, and thermal sensibility test was negative. On radiological and clinical examinations, revealed a radiolucency of periapical tissue with C-shaped root canal morphology. Based on the results of clinical tests and radiographic evaluations, the patient was diagnosed with Asymptomatic apical periodontitis (AAP) with previously treated pulp. (Figures 2, 3, 4):

The treatment began after administering inferior alveolar nerve block anesthesia Septanest (4% Articaine hydrochloride with 1:100000 Epinephrine), (Septodont, Saint-Maur-des-Fosses Cedex, France) using Carpo syringe. An access cavity was prepared, rubber dam was applied and four root canal orifices were localized with C-shaped canal system. Use of magnification (Univet Loupes 3.0 Spa, Rezzato, Italy) during the endodontic treatment showed helpful. The old composite was removed. Eucalyptus oil (Cerkamed, Stalowa Wola, Poland) to dissolve the guttapercha was used, and the root canals were explored with size 10, and 15 K-files (Diadent, France). The patency was determined using K-file size 10 and 15. A glide path was prepared using a 15 K-file, and canal lengths were determined using an Eighteenth E-pex pro apex locator (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth). Root canals were prepared using with E-flex blue rotary files (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth, China) 25/04 using crown down technique. While cleaning and shaping a C-shaped canal system attention should be paid to isthmus, debris and pulp tissue which usually remain inside continuously C-shaped canals. The isthmus should not be repaired with larger than no 25 files, otherwise, stop perforation is likely [18]. After proper working length determination, all the canals were joined at the apical third of the root. The root canals were irrigated after each change of rotary file, with 1 ml of 5.25% sodium hypochlorite solution

applied to each canal following Marcus Haapasalo protocol [17]. Irriflex - flexible root canal irrigation needle (Produits Dentaires SA Vevey, Switzerland) was used. During shaping and cleaning of each canal, the operators performed irrigation of 5ml of 5.25 % sodium hypochlorite (Cerkamed, Stalowa Wola, Poland) and 2ml of 17% EDTA (Cerkamed, Stalowa Wola, Poland) for 2 min to remove the smear layer in each canal activated with ultrasonic device Ultra X (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth, China) for better cleaning and shaping isthmus area. Ultrasonic device could be more effective for thorough debridement and cleaning of the isthmus area. After cleaning and shaping were completed and after the canals were dried with sterile paper points obturation was performed with warm vertical compaction technique. The root canal working length was controlled with rotary file and confirmed with guttapercha radiography followed by obturation of root canals with vertical compaction and thermoplastic guttapercha injection using Fast Pack and Fast Fill (Changzhou Sifary Medical Technology Co.,Ltd, Eighteenth, China). Guttapercha



Figure 3

- A. First diagnostic radiography;
- B. Radiographic image after removing the old root canal filling from canal space;
- C. Clinical view of cavity after cleaning and shaping.
- D. Clinical view of cavity after obturation;
- E. Final radiographic image;
- F. One year follow up radiographic image.

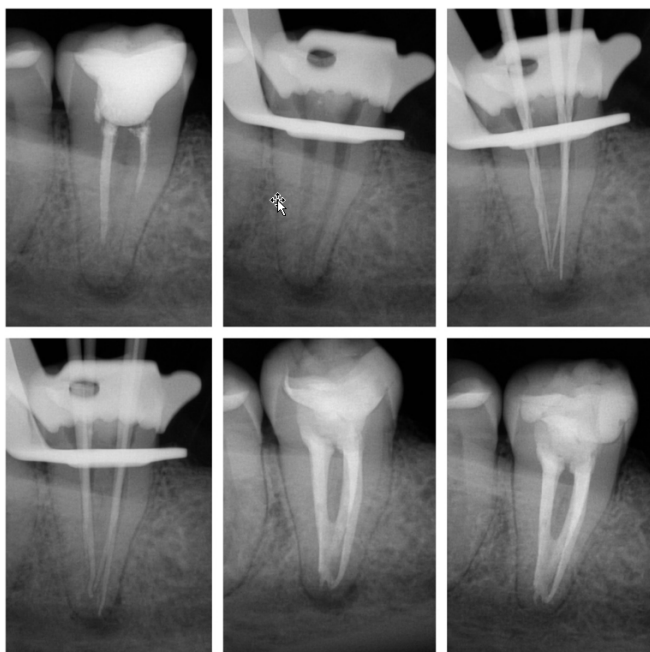


Figure 4

- A. First diagnostic radiography;
- B. Radiographic image after removing the old root canal filling from canal space;
- C. Verification of working length with rotary file;
- D. Confirmation of working length with guttapercha;
- E. Final radiographic image;
- F. One year follow up radiographic image.

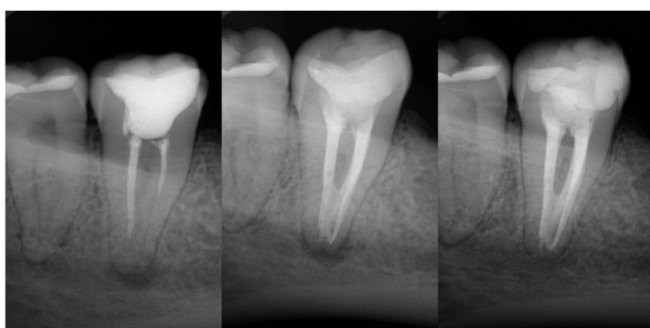


Figure 5

- A. First diagnostic radiography;
- B. Final radiographic image;
- C. One year follow up radiographic image.

size was 25/04 (Diadent, France) in combination with Sealapex sealer (Kerr Corporation, Orange, CA, USA). Endodontic treatment was completed in one visit. The patient after the endodontic treatment, did not show any signs of discomfort or pain. In order to verify the success of the treatment, the patient was called for a follow-up visit after one year, an X-ray was taken. One year follow up shows complete healing. However, radiographic control should be continued for some time.

Discussion

The knowledge of common root canal morphology and its frequent variations is a basic requirement for success during root canal procedures [19]. Variations in the root configurations can impose problems during endodontic treatments. An increased volume of irrigation and deeper penetration with small K-file using ultrasonic activation may allow more cleanliness in shaped area of C-shaped canal [8]. The management of this C-shaped canal needs proper clinical and radiographic evaluations, advanced techniques for cleaning, shaping and obturation. Proper knowledge of root canal anatomy and its variations are essential for correct diagnosis and successful outcome of the endodontic treatment. Possible variations in root canal anatomy need to be understood properly in order to prevent endodontic treatment failures. Knowledge of the complexity of root canal system is essential to understand the principles and problems encountered in access preparation. The complexity of the root canal system is best understood by the integration of formal knowledge of tooth anatomy and the interpretation of radiographic documentation [19, 20]. Unsuccessful root canal treatment and flare ups were more likely to happen because of variations in root canal morphology [20]. During the endodontic treatments, the use of magnification, such a dental loupes or microscope are useful in canal orifice identification and to manage these cases effectively. The factors determining the success in recognizing the canals depends on the size and construction of the canal, degree of curvature, size and flexibility of file, along with the skills of operator. [16, 21]

Conclusion

The material and method applied in the presented cases proved to be successful in the endodontic treatments. A good understanding of root canal morphology anatomy helps to reduce the number of missed canals during treatment. In second case one year follow up shows complete healing. However, radiographic control should be continued for some time. The clinical diagnosis of a C-shaped canal before root canal treatment is important to facilitate the endodontic procedure and to avoid missed

canals. Endodontic treatment of mandibular molars with C-shaped canal may be challenging to every clinician. C-shaped canal can be easily diagnosed by a careful evaluation of pre-operative radiographs. Early recognition of morphological variations can be done by using newer diagnostic techniques like CBCT. In cases with variations and complex morphology we will need more advanced equipment and devices that will lead to a successful treatment.

Competing interests.

The author declare that they have no competing interests.

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“SMALL MOLAR” AS AN ENDODONTIC CHALLENGE

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ABSTRACT

Background: This case report describes the successful endodontic treatment of the upper first premolar with three roots and three root canals. The prevalence of this morphological form in the population of Bosnia and Herzegovina is exceedingly uncommon. The primary objective of this paper is to highlight the difficulties in diagnosing and treating teeth with unusual root canal morphology.

Case presentation: To establish a diagnosis, the patient underwent a comprehensive clinical examination including endodontic tests and radiographic imaging. Analyzing the segmented CBCT image confirmed the presence of three roots and three root canals, as predicted. The T-shaped outline of the access cavity was achieved using an ultrasonic cone diamond tip. The obstruction in the palatal canal was successfully resolved using the step-down instrumentation technique. Following the application of calcium hydroxide medication, the canals were filled using the monocone obturation. A follow-up periapical image, one year later, revealed periapical tissue healing.

Conclusion: Practitioners must be aware of the possible morphological variations of root canals. CBCT imaging is recommended for precise diagnosis and treatment planning in these clinical situations.

Keywords: atypical root canal morphology, first upper premolar, endodontic treatment, CBCT

Introduction

The main goal of endodontic treatment is to eliminate microorganisms as much as possible from the entirety of the root canal system through effective cleaning and shaping procedures. Achieving this goal requires practitioners' knowledge of root canal morphology. Ignoring anatomical features can lead to iatrogenic errors, such as unrecognized and untreated root canals which can increase the risk of the treatment failure [1].

The external appearance and morphology of the root canals of the first upper premolar are highly variable. According to the previous study, in the population of Bosnia and Herzegovina, Vertucci type IV, characterized by two completely separate canals in one or two roots, was the predominant form accounting for 56.5%. Following this, Vertucci type II, featuring two canals merging into one, constituted 18.5%. Only 2.2% of the first upper premolars exhibited the form, characterized by three roots and three completely separate canals [2]. Because of the third root, this particular form was often referred to in literature as the "small molar" or "ridiculous molar," owing to its resemblance to adjacent molar teeth. Management of these cases is challenging due to their infrequency and challenges in diagnosis, access, instrumentation and restoration [3].

The periapical radiograph of the tooth is the most common tool used for assessing the morphology of roots and root canals. However, it is important for the clinician to recognize the limitations of the two-dimensional image. Therefore, in certain cases, it may be necessary to perform three dimensional CBCT (Cone Beam Computed Tomography) imaging to get more detailed information and to prepare for endodontic treatment of teeth with atypical morphology [4,5].

This case report describes the nonsurgical endodontic treatment of the maxillary first premolar with three roots and three root canals.

Case report

A 20-year-old female patient presented at the Department of Restorative Dentistry with Endodontics at the Faculty of Dentistry with Dental Clinical Center, complaining of discomfort in the right

upper jaw region. The patient's medical history was unremarkable.

The intraoral clinical examination revealed a carious lesion located disto-proximally on tooth 14. The tooth exhibited mild sensitivity to vertical percussion and did not respond to the cold test. A panoramic radiograph was obtained to evaluate the patient's overall dental condition. The radiograph revealed a large carious lesion on tooth 14, located near the pulp chamber. Additionally, it displayed an unusual shape of the roots (**Figure 1**). The subsequent periapical radiograph revealed a maxillary first premolar with three roots and a periapical radiolucency surrounding the apical portion of the palatal root (**Figure 2**). The anatomy of three distinct roots was verified by segmental CBCT imaging (**Figure 3**). Periapical radio-lucencies were detected on the palatal and mesio-buccal roots, as shown in **Figure 4**.



Figure 1

An orthopantomogram revealed a deep carious lesion on tooth 14, along with an unusual root morphology.



Figure 2

Initial periapical radiography shows a maxillary first premolar with three roots and periapical radiolucency.

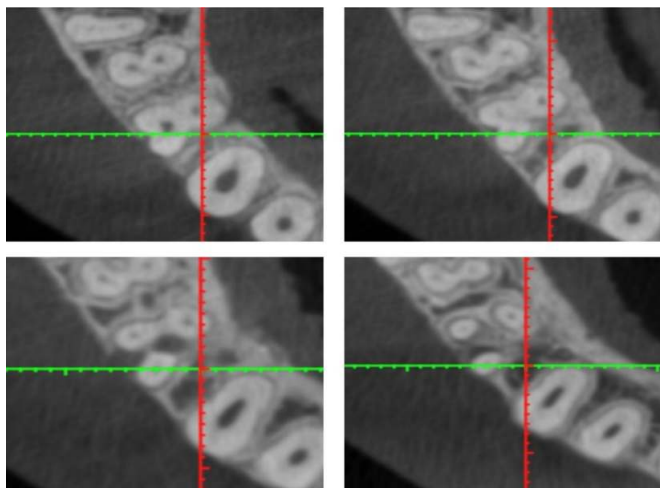


Figure 3

In axial CBCT view, three separate roots were confirmed.

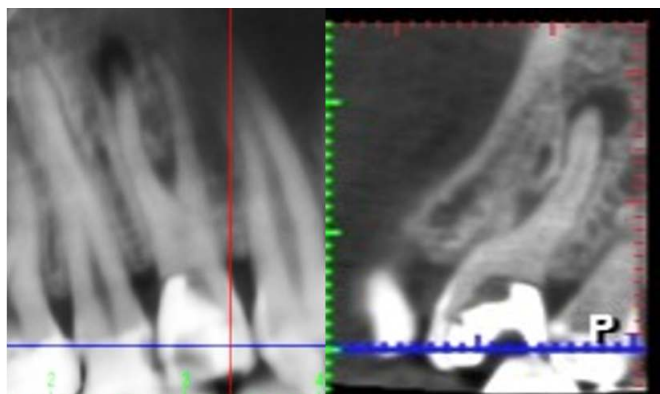


Figure 4

Periapical radiolucencies on mesiobuccal and palatal root- coronal CBCT view.



Figure 5

Postoperative periapical image -obturation control.

Pulp necrosis with asymptomatic apical periodontitis was diagnosed.

Case management

To create optimal circumstances for performing endodontic therapy, the decayed tissue was removed and the distal wall of the crown was replaced with a composite filling.

The endodontic procedure was carried out under aseptic conditions with the use of an operating microscope (Carl Zeiss OPMI Pico, Germany). The access cavity has been modified in order to ensure straight access to the root canals. After entering the pulp chamber with a diamond round bur, the access cavity was expanded mesiodistally and palatal. An ultrasonic cone diamond tip (Satalec Acteon, France) was used to achieve T-shaped outline form [6]. Examination of the pulp chamber floor revealed three root canals orifices. The coronary parts of all three root canals were widened with an orifice opener. Subsequently, root canals were negotiated by using a small hand K file size 10 (Denco Medical Co., Shenzhen, China) with watch-winding movements. The patency and glide path were established in mesio-buccal and distobuccal root canals. However, an obstruction had to be removed from the palatal root canal. The obstacle was overcome using the step-down technique. The coronal and middle thirds of the canal were initially prepared by using Denco Pro-flexy files up to size 25/04. This allowed the pre-bent K-file size 10 to scout the apical anatomy [7]. The working length of all three root canals were established by using an electronic apex locator (Woodpecker Guilin, China). Endodontic treatment was continued using Pro-flexi rotary files (Denco Medical Co., Shenzhen, China), following in the sequence with copious irrigation with a combination of 3% NaOCl and 40% citric acid. The canals were dried with paper points and an intracanal dressing of calcium hydroxide (Calxyl, OCO-Preparate GmbH, Germany) was applied in all three root canals for two weeks. The access cavity was sealed by temporary restorative cement (Cavit-G, 3M ESPE, St. Paul, MN, USA).

Subsequently, the root canals were filled with gutta-percha and epoxy sealer (AH Plus, Dentsply Maillefer, Tulsa, OK, USA) using monocone obturation technique. The endodontic fillings were sealed with temporary restorative cement (Cavit-G,



Figure 6

Follow- up periapical image one year after treatment.

3M ESPE, St. Paul, MN, USA) and a postoperative radiograph was taken (**Figure 5**). The next day, the temporary filling was replaced with a composite restoration.

The complete resolution of the process in the bone was observed on follow- up periapical image one year later (**Figure 6**).

Discussion

Failure to recognize additional root canals is a common cause of endodontic treatment failure. The process of identifying and accessing root canals in teeth with atypical canal morphology represents a challenge in endodontics. The morphology of the root canals of the first maxillary premolar shows considerable variability. Studies indicate that up to 6% of these teeth possess three canals [2, 8, 9].

Identifying the three canals in the maxillary premolar on preoperative radiographs can often be difficult. Despite the fact that preoperative periapical radiography only provides a two-dimensional image of a three-dimensional object, there are certain indicators that suggest the possible existence of a third canal or root. If there is a sudden straightening or loss of radiolucent canal in the pulp cavity, it is advisable to consider the presence of a third canal (10). Sieraski et al. [5] discovered that in straight-on radiographs of maxillary premolars, if the mesio-

distal width of the mid-root image is the same as or larger than the mesio-distal width of the crown, it is highly probable that the tooth has three roots. However, this rule cannot be applied in situations where the premolar has two roots, of which there are two canals in the buccal root.

Although periapical radiographs are commonly used in endodontics, there are certain clinical scenarios where CBCT imaging is necessary for further diagnosis. The utilization of CBCT imaging is progressively being embraced to enhance the examination of atypical canal morphology and to efficiently detect supplementary roots. In addition, the pictures provide a more precise visualization of bone tissue resorption [11]. In our particular situation, a segmented CBCT scan was conducted before performing endodontic therapy due to the suspicion of an extra root. The CBCT scan revealed the presence of three separate roots in the first upper premolar. The loss of bone structure above two roots, the palatal and mesiobuccal, was also observed.

The number one guide in determining the outline form of the access cavity is the location of the root canal orifices [12]. The access cavity, in our case, was modified from an oval to a T-shaped form to show the orifices of the buccal root canals. When there is a risk of perforation, it is important to use ultrasonic tips to create an access cavity for better visibility and precision in dentin removal (13). In the present case, the ultrasonic diamond tip was used to achieve outline form.

Conclusion

The success of endodontic therapy relies on dentists' ability to identify the morphological variability of the tooth. Knowledge of standard tooth anatomy and possible deviations leads to good planning of further treatment and reduces the possibility of procedural error. The CBCT imaging allows for a clear analysis of the position and number of extra roots and canals, as well as the existence and size of the periapical process.

Declaration of Interest: Authors declare NO conflict of interest.

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8TH. DENTAL CONGRESS OF IN BOSNIA AND HERZEGOVINA WITH INTERNATIOANL PARTICIPATION

ABSTRACTS OF INVITED LECTURES

Type of presentation: invited lectures

CONTEMPORARY COMPOSITE MATERIALS, THEORETICAL PRINCIPLES AND CLINICAL PRACTICE

Prof. dr. Selma Jakupović

University of Sarajevo - Faculty of Dentistry
with Clinical Dental Center, Bosnia and Herzegovina

ABSTRACT

Composite materials are the most commonly used materials for making direct fillings. The physical, chemical, mechanical and aesthetic properties of composite materials have been improved over the years. However, their biggest disadvantages are polymerization shrinkage and the long-term making of fillings due to the limited depth of polymerization. By introducing into practice bulk-fill composites with low-shrinkage monomers, more potent photoinitiators, and innovative properties reducing polymerization stress, the process of making fillings has been accelerated and facilitated. Also, with the introduction into practice of modern high-intensity polymerization devices, the duration of the restorative procedure was shortened with a satisfactory degree of conversion. In this lecture, it will be discussed how the composition of composite materials, as well as the method of polymerization, can affect the properties of composite restorations.

Type of presentation: invited lectures

DIGITAL VS. ANALOGUE

Assist. prof. dr. Mihael Stanojević

Medical Faculty in Foča, University of East Sarajevo,
Bosnia and Herzegovina

ABSTRACT

We are aware of the digitization that is happening all around us, both in our everyday life and in our professional environment. In recent years, there has been a strong digitalization trend in dentistry, with announcements that most procedures will move into the digital sphere. Digital smile design, CAD-CAM, intraoral scanners, digital files, digital X-ray diagnostics, these are all terms that we are very familiar with, and which we understand and use. Should we ask ourselves whether digital tools help us and make our daily work easier, or whether they can completely replace certain "analog" procedures used so far. We must certainly take into account that any learning, for analog or digital mode of operation, requires a certain amount of time to master procedures and work skills. So, we must first learn to walk, so that we can start running in the digital race. But we also have to ask ourselves whether "analog" is outdated and losing the race to digitization, or whether "analog" procedures can still compete with digital procedures.

There is also the question of the profitability of certain digital technologies, whether the price of digitization, the time spent in learning and improving skills covers the costs of doing business compared to "analog" procedures.

Type of presentation: invited lectures

ASSOCIATION BETWEEN PERIODONTITIS AND CEREBROVASCULAR DISEASES

Prof. dr. Ivan Puhar

Faculty of Dentistry of University of Zagreb, Croatia

ABSTRACT

Periodontitis is a chronic inflammatory disease of the tooth supporting tissues, the main clinical features of which include loss of attachment and alveolar bone, formation of periodontal pockets and inflammation of the gingiva. The prevalence of periodontitis is about 50%, with up to 15% of the population affected by advanced forms. A special field of periodontology studying the relationship between periodontal health/disease and extraoral health/disease is called periodontal medicine. Periodontal disease is an independent risk factor for atherosclerosis, adverse pregnancy outcomes, poor metabolic control of diabetes, respiratory diseases, rheumatoid arthritis, etc.

Cerebrovascular disease is one of the leading causes of mortality and disablement. Chronic inflammatory conditions, such as periodontitis, may lead to atherosclerotic changes and a subsequent stroke. The main concept is that periodontal inflammation and periodontal bacteria add to the overall inflammatory burden at the systemic level thus affecting the severity, incidence and progression of cerebrovascular diseases. An independent association between periodontitis and stroke risk has been demonstrated, as well as their mutual risk factors.

The lecture will present the basic postulates of periodontal medicine with a special focus on the association between periodontitis and cerebrovascular diseases.

Type of presentation: invited lectures

PHARMACOLOGICAL TREATMENT OF ODONTOGENIC INFLAMMATION

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ABSTRACT

Pharmacological treatment of odontogenic inflammation includes the use of antibiotics when indicated to use and the use of additional measures such as hydration of the body or the use of analgesics as needed. Antibiotics used in the treatment of bacterial odontogenic infection are amoxicillin and clavulanic acid, metronidazole, clindamycin, clarithromycin and azithromycin. Antibiotic therapy of odontogenic infection is most often empirical, whereby the antibiotic is chosen with the assumption that it will work on the most likely causative agent, and for this reason, a broad antimicrobial spectrum of antibiotic is prescribed. If the clinical response to the empirically prescribed antibiotic is good, its use is continued. The first choice is amoxicillin and clavulanic acid, which, due to the clavulanate in the composition, also shows activity against beta lactamase producing strains. When it comes to pain therapy with oral analgesics, the treatment should be started with analgesics of weaker effect and then gradually introduce analgesics of stronger effect. Nonsteroidal anti-inflammatory drugs are the first-choice analgesic therapy for pain relief in odontogenic infections. Nonsteroidal antirheumatic drugs such as dexketoprofen and naproxen are safe and effective in treating all levels of dental pain, from mild to severe. Oral antiseptics based on lysozyme have found their application in the pharmacological treatment of abscesses and after tooth extraction.

Key words: amoxicillin clavulanic acid, nonsteroidal antirheumatic drugs, lysozyme

Type of presentation: invited lectures

SHORT IMPLANTS VS. CONVENTIONAL IMPLANTS WITH A NEW APPROACH OF JAWS VESTIBULOPLASTY – THE STATE OF THE ART AND FUTURE

Tomislav Katanec, PhD

Faculty of Dentistry of University of Zagreb, Croatia

ABSTRACT

Atrophy of the bone of the alveolar ridge is becoming an increasing challenge in modern oral surgery and implantology procedures. With the presence of numerous bone augmentation options, and the technique of raising the floor of the maxillary sinus, in this case, a modern approach to the installation of "short" implants is chosen.

This sponsored lecture presents cases of aged patients with completely atrophic edentulism of the lower and upper jaw, and hypertrophy of the attached gingiva in the area of the front part of the lower jaw caused by irritation of an inadequate lower complete denture.

In the first operation, vestibuloplasty was performed according to the principle of secondary epithelization using blood plasma enriched with growth factors (PRGF).

Four weeks after the first procedure, the patients underwent a second oral surgical procedure, in which four short implants measuring 4.0 x 5 mm were inserted. Due to the pronounced resorption of the alveolar ridge, the distance from the top of the alveolar ridge to the alveolar nerve in the distal parts of the mandible is between 2 and 3 mm. According to the therapeutic indication, it is decided to display both openings n. mentalis, and implant implants directly in front of the outlet so that the patient's sensation in the innervated region remains preserved.

After the implant procedure is completed, multi-unit abutments and prosthetic carriers are immediately placed on the installed implants and a single-phase polyether impression is taken.

A few hours after the procedure, the patient receives a ready-made fixed-prosthetic temporary work made of acrylic being fixed with screws for multi-unit abutments covering the region of the mandible from the left lower first molar to the right lower first molar.

Type of presentation: invited lectures

HOW TO ACHIEVE QUALITY DENTAL RESTORATIONS

Prof. dr. Rade Živković

Faculty of Dentistry of University of Belgrade, Serbia

ABSTRACT

Contemporary dentistry strives to continuously improve the procedures for creating dental restorations in patient care. The advancement of digital dentistry has made digital impressions a routine procedure in dental practices. The decision to use conventional methods or oral scanners and digital procedures for taking impressions depends on various factors. In this presentation, several patients who have been reconstructed with fixed dental restorations on prepared teeth or implants will be showcased, highlighting the different impression of used techniques. The advantages of digital impressions and their impact on the overall quality of prosthetic rehabilitation will also be discussed.

Type of presentation: invited lectures

ANTERIOR VERTICAL DISCREPANCY TREATMENT WITH ALIGNERS

Prof. dr. Ferdi Allaf

ITU University, Türkiye

ABSTRACT

The lecture will cover: etiology of open bite, diagnosis (skeletal and dental), treatment strategies and options, biomechanics of open bite closure, absolute extrusion versus relative extrusion, molar intrusion, finishing after anterior open bite closure, TAD assisted molar intrusion for bite closure, evidence-based approach for patient treatment, case presentation with interactive discussion and questions and answers.

Type of presentation: invited lectures

THE SCIENTIFIC AND CLINICAL PRINCIPLES OF SINGLE VISIT ENDODONTIC THERAPY

Andreas Bartols, PhD

Dental Academy for Continuing Professional Development
in Karlsruhe, Germany

ABSTRACT

Single-Visit Endodontics offers a convenient and efficient treatment option with studies showing no significant difference in success rates compared to multiple-visit treatments. It is suitable for cases without complex issues such as severe preoperative conditions and can improve patient comfort and practice efficiency. However, it requires careful case selection and high-quality treatment protocols to minimize the risk of complications and flare-ups.

Type of presentation: invited lectures

IMMEDIATE IMPLANTATION WITH IMMEDIATE PROSTHETIC RESTORATION: PROCEDURE FOR SINGLE TOOTH LOSS AND EDENTULOUS

Prof. dr. Michael Korsch

Dental Academy for Continuing Professional Development
in Karlsruhe, Germany

ABSTRACT

Tooth loss is always a dramatic event for patients. Therefore, rapid functional and aesthetic rehabilitation is desirable. The lecture addresses the indications, risks, limitations and complications as well as problem solutions. The procedure for individual tooth loss and edentulism is illustrated using case studies.

Type of presentation: invited lectures

APHTES AND SMALL LESION IN ORAL CAVITY

Prof.dr. Verica Pavlić

Medical Faculty in University of Banja Luka,
Bosnia and Herzegovina

ABSTRACT

During the lecture, the prevalence and most common causes of aphthae and minor lesions in the oral cavity will be presented, along with the clinical picture and possible complications. Prevention and therapeutic options, differentiation of therapy and benefits of certain therapeutic groups will be presented.

Type of presentation: invited lectures

PREVENTION AND PROPHYLAXIS AS A BASELINE OF COMMUNICATION AND TRUST IN EVERYDAY PRACTICE

Prof. dr. Ivana Radović

Faculty of Dentistry of University of Belgrade, Serbia

ABSTRACT

Caries and periodontopathies are dynamic diseases requiring a well-balanced preventive and restorative treatment. The last few decades have witnessed a remarkable increase in scientific knowledge related to oral health and the development of evidence-based dentistry. The importance of prevention and control of oral diseases and maintenance of good oral health are becoming increasingly recognized by the scientific community, as well as by the dental and general public. However, despite significant knowledge in this area, there are disparities and large segments of the population disproportionately burdened by oral diseases. Quality nutrition, application of fluoride and fissure sealings are proven strategies that must be the basis of any preventive-prophylactic plan. However, despite the proven effectiveness of these methods, they are not universally spread and applied. It is important to emphasize that, in accordance with the evidence-based dental approach, current clinical recommendations should be integrated with an individual approach to the patient, with the professional assessment of the dentist, as well as with the needs and preferences of the patient. The lecture provides an overview of preventive and prophylactic measures in different age groups and depending on the risk for caries, with a special emphasis on measures for the effectiveness of which the highest level of scientific evidence has been established. Attention will also be paid to the importance of these measures for building a quality relationship with patients and the functionality of other areas of daily dental practice.

Type of presentation: invited lectures

DEKSKETOPROFEN IN THE THERAPY OF DENTAL PAIN

Prof. dr. Nina Marković

University of Sarajevo-Faculty of Dentistry
with Clinical Dental Center, Bosnia and Herzegovina

ABSTRACT

The main topic of the lecture is dental pain, the causes of pain, the possibilities of prevention, i.e. alleviation of dental conditions in which pain is an accompanying symptom. The classification of pain, its most common causes in dental practice and potential therapeutic options will be shown. *Deksketoprofen* and its role in the treatment of dental pain will be presented.

Type of presentation: invited lectures

APPLICATION OF CBCT SOFTWARE IN EVERYDAY DENTISTRY

Prof. dr. Zoran Vlahović

Faculty of Medical Sciences Pristina – Kosovska Mitrovica

ABSTRACT

Computer Tomography is a medical imaging technique promoted as a new concept of diagnostic radiology, but with the advancement of technical features of medical devices and accompanying software support, today, it is the gold standard when it comes to diagnostic procedure methods for the cranio-facial region for both dentistry and otolaryngology. Our presentation explains the possibility of CBCT software. We will present some interesting cases from oral surgery and implantology (diagnostics, therapy following procedures, implantology planing) where the use of CBCT is of vital importance from the diagnostic standpoint. Furthermore, on concrete practical cases, we will present the role of CBCT software within computer-assisted dentistry, i.e. computer-aided navigation in dental implantology and 3D printing of implant surgical guides, our experience, advantages and disadvantages of these procedures.

ABSTRACTS OF ORAL PRESENTATIONS

FIELD OF DENTISTRY: General dental praxis

Type of presentation: Oral presentation

INDICATIONS AND JUSTIFICATION FOR THE USE OF CBCT IN DENTAL DIAGNOSTICS

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ABSTRACT

Introduction: CBCT allows us to accurately diagnose the patient's condition and select the optimal therapy for dental procedures. We use this type of imaging as a diagnostic tool to identify pathologies of the oral and maxillofacial region and when planning therapeutic procedures in situations where standard radiographic imaging is not sufficient.

Material and methods: Conventional digital imaging prevents accurate diagnosis of some pathological conditions due to image overlapping and geometric distortion. The CBCT device generates a 3D image of dental structures, soft tissues, nerve pathways and bone structures in the craniofacial region. Through examples from clinical practice, the indications and justification for the use of CBCT in relation to conventional digital imaging will be presented.

Discussion: The ALARA principle should always be taken into account when indicating the referral for this type of radiological imaging, especially in a sensitive patient group such as children.

Conclusion: CBCT is an excellent tool in modern dental procedures. However, as with any device that emits ionizing radiation, the benefits of using CBCT must outweigh the risks.

Keywords: CBCT, ALARA, radiological diagnostics.

FIELD OF DENTISTRY: Preventive dentistry

Type of presentation: Oral presentation

INCIDENCE OF BRUSHING TEETH OF A SIX-YEAR-OLDS IN THE AREA OF A CITY ZIVINICE IN THE YEAR 2023

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³Doctor of dental medicine

ABSTRACT

Introduction: Proper and regular teeth brushing at young age, can help children develop healthy habits and teach them practice that can prevent caries development. Consistency of oral hygiene leads to healthy teeth from first primary tooth until old age. Goal of research is to analyze what is the incidence of brushing teeth among six-year-olds in the area of the city Zivinice.

Materials and methods: The research covered polling of parents of the six-year-olds in 2023, who came to examinations in the Public Health Center in Zivinice. Polling data gave us information about habits and practice among children.

Results: Research covered 50 children. From the survey questionnaire, it is affirmed: 74% of examinees brush their teeth twice a day, 16% of examinees do it more than twice daily, and 10% brush their teeth only once a day. 4% of parents claimed that their child brush teeth several times a week (2-6). 52% of parents said that their child from the start maintains oral hygiene with the occasional help, and 4% of the children from the start do it independently without their parent's or caregiver's help.

Conclusion: Based on the data obtained, it is concluded that incidence of teeth brushing among six-year-olds in 2023. in mentioned area is satisfying. Preventive measures and engagement of dentists in the previous years have led to improvement in oral hygiene among six-year-olds.

Keywords: teeth brushing, oral health, six-year-olds.

FIELD OF DENTISTRY: Endodontics

Type of presentation: oral presentation

ENDODONTIC AND SURGICAL RETREATMENT OF UPPER INCISORS

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ABSTRACT

Introduction: This case report describes the endodontic and surgical retreatment of teeth 11 and 12, 14 years after primary endodontic and surgical therapy, which was performed due to the consequences of trauma in an 11-year-old girl. The primary goal of this paper is to point out the need for longer follow-up of endodontic therapy outcomes.

Case report: A twenty-five-year-old girl presents to the Clinic for Dental Pathology with endodontics due to the development of a fistula in the projection of the apex of the upper right central incisor, which was also confirmed by a clinical examination. Analyzing the panoramic image taken in the same visit, inhomogeneous endodontic filling of the root canals and radiolucent zones in the periapical region of teeth 11 and 12 are observed. The same teeth are also noticeably shorter, which is a consequence of the initial apicotomy that the patient also mentions in the dental history. The origin of the fistula was determined by fistulography, and the size of the periapical change by segmental CBCT. The removal of the previous filling is approached with the help of ultrasound and endodontic revision files. The working length is determined by an orientational retroalveolar image with test gutta-perchas in the root canals, due to the inconsistent and unreliable display of the working length on the apex locator. Irrigation of the root canals was done with 3% NaOCl, while the final irrigation was done with 2% chlorhexidine digluconate, and after copious rinsing with saline solution. Intracanal calcium hydroxide medication is renewed every 20 days for 2 months. Due to the persistent fistula, and in consultation with

the oral surgeon, a new apicotomy was performed on teeth 11 and 12. Preoperatively, the root canals are obturated using the cold lateral condensation technique. On the retroalveolar image 3 months later, a reduction of periapical lesions is evident, and clinically the patient is symptom-free and without fistula. One year after the endodontic and surgical retreatment, the retroalveolar image shows the healing of the bone defect with the absence of signs and symptoms of periapical disease.

Conclusion: Dentists should be aware of the need for longer-term follow-up of endodontic therapy outcomes, especially those teeth with periapical changes due to their regression monitoring.

Keywords: endodontic retreatment, fistula, apicotomy, control examinations

FIELD OF DENTISTRY: Endodontics
Type of presentation: oral presentation

ROOT CANAL MORPHOLOGY OF MAXILLARY MOLARS

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ABSTRACT

Introduction: This research aims to present the root canal morphology of maxillary third molars in population of Bosnia-Herzegovina using the cleaning procedure.

Material and methods: The study included 105 extracted maxillary third molars in total. Shortly after trepanation and removal of the pulp tissue, a dye was injected into the root canals and then eliminated through apical foramen by vacuum suction. Complete transparency of the samples was attained through the steps of the cleaning procedure. Maxillary third molars are categorized into 10 types (Alavi classification) based on the number and shape of the roots. The type of root canal (Vertucci classification), frequency of inter-canal communication and lateral canals were identified using a stereomicroscope (x15).

Results: Three fused roots (Alavi Group IV) and three root canals (type VIII of the Vertucci classification) are the most common features of maxillary third molars in the population of Bosnian-Herzegovina. Lateral canals and inter-canal communications are most common in the middle third of the root. The presence of additional root canal types was documented, particularly in groups with fused roots.

Conclusion: Maxillary third molars with root canal morphology appropriate for endodontic treatment are the rarest. Every patient requires a personalized evaluation of the endodontic therapy outcomes based on the morphology of their root canals.

Keywords: maxillary third molars, root canals, endodontic therapy

FIELD OF DENTISTRY: Endodontics
Type of Presentation: Oral presentation

EXTERNAL WHITENING OF MAXILLARY CENTRAL INCISOR WITH CALCIFIC METAMORPHOSIS – CASE REPORT

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ABSTRACT

Introduction: Calcific metamorphosis (CM) is characterized by obliteration of the pulp canal space after contusion or subluxation injury of the tooth which can be clinically detected as early as three months after injury. The aim of this paper was to provide details of aesthetic treatment approach of the tooth with calcific metamorphosis.

Case report: A 22-year-old female patient referred to the Department of Dental Pathology with Endodontics from Health Center of the Sarajevo Canton for the endodontic treatment in March 2024. In her medical history, she declared that she fell off from a bicycle in 2009, and was treated by a maxillofacial surgeon. She submitted all medical records with two orthopantomograms taken one and five years after the injury. Clinical examination revealed yellow discoloration, loss of transparency and position of the crown of tooth 21 suggesting previous lateral luxation injury. Compared to the contralateral maxillary incisor, a cold test was negative, while palpation and percussion were unremarkable. The RVG image revealed complete absence of contours of pulp chamber and root canals with intact lamina dura. Based on clinical examination and RVG image, calcific metamorphosis without periapical changes with discoloration of the tooth crown was diagnosed. It was decided to perform single-tooth external whitening. The whitening treatment was performed using 35% carbamide peroxide (The Smile Professional 35% Carbamide Peroxide, Unica, Italy) for 30 minutes through five sessions until satisfactory results.

Conclusion: After any dental trauma, long-term periodic follow-ups are necessary. Teeth without symptoms or radiographic signs of periapical pathosis with pulp canal obliteration that occurred after trauma do not need endodontic treatment. External whitening can be used in the management of discoloured teeth.

Key words: calcific metamorphosis, trauma, bleaching, obliteration of pulp space, whitening.

FIELD OF DENTISTRY: Oral Surgery
Presentation Type: Oral presentation

ALB-PRF AND H-PRF MEMBRANES IN HEALING LARGE CYSTIC DEFECTS

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ABSTRACT

Introduction: Platelets play a crucial role not only in stopping bleeding but also in tissue regeneration, collagen synthesis, angiogenesis and immune response. The concept of obtaining platelet concentrates manipulates normal physiological processes to obtain concentrated platelets and growth factors supporting wound healing and tissue regeneration. ALB-PRF represents a new platelet concentrate combining autologous albumin gel and platelet-rich fibrin (PRF) in a liquid form. This study explores the application of ALB-PRF in oral surgery practice with a focus on its regenerative role in bone defect filling after cystectomy.

Case Presentation: This paper describes the case of a sixty-one-year-old female patient diagnosed with a large cystic lesion in the upper anterior region during routine OPG examination as part of pre-prosthetic preparation. The patient reported a history of myocardial infarction and implantation of two stents. At the time of examination, she was in good psychophysical condition and asymptomatic.

As part of the surgical protocol, phlebotomy was performed in plastic additive-free tubes, which were centrifuged in a horizontal centrifuge at 700 rcf for 8 minutes. The upper 2/3 of platelet-poor plasma were then heated to 75°C for 10 minutes to obtain an albumin gel. The remaining platelet-rich plasma and growth factors were poured onto the cooled gel. After 15 minutes, the product known as ALB-PRF was congealed and ready for use. H-PRF membranes were obtained using the same protocol with red-capped tubes.

The surgery involved the extraction of residual tooth roots and cystectomy. During the procedure, it was noted that the cyst had destroyed a significant portion of the vestibular and partially the palatal bone and nasal mucosa. The cyst contents were dirty yellow in color. The bone defect was filled with H-PRF membranes and ALB-PRF using a sandwich technique. The mucoperiosteal flap was elongated, adapted over the defect and primarily sutured. Postoperative care included antibiotics, anti-inflammatory drugs and cold compresses. All follow-up examinations proceeded smoothly with excellent clinical and radiological healing.

Conclusion: This study highlights the potential of ALB-PRF as a safe and effective material for treating cystic defects in oral surgery practice. ALB-PRF has an advantage over conventional PRF membranes due to its slow-resorbing nature, which allows the prolonged release of growth factors and extends its regenerative potential.

Keywords: ALB-PRF, H-PRF, horizontal centrifugation, radicular cyst, healing

FIELD OF DENTISTRY: Oral Surgery
Presentation Type: Oral presentation

PREPROSTHETIC SURGERY OF BILATERAL MANDIBULAR TORI: A KEY STEP TOWARDS OPTIMAL PROSTHETIC REHABILITATION

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ABSTRACT:

Mandibular tori, a benign bony growth, is common on the inner side of the lower jaw or its alveolar extension. Although its causes are not fully understood, research suggests a multifactorial etiology involving genetic predispositions, environmental factors such as bruxism and disruptions in calcium and vitamin regulation. Clinically, tori are often bilateral and can vary in size. Although usually asymptomatic and without malignant potential, removal of mandibular tori is sometimes necessary especially before making complete dentures.

A case of an elderly female patient undergoing surgical correction of bilateral mandibular tori as part of pre-prosthetic preparation is presented. A precise surgical procedure, including the piezo surgery technique in combination with chisel, was performed under local anesthesia. The postoperative course was regular and the wound healed successfully.

Conclusion: Mandibular tori removal is an important step in preparing patients for prosthetic rehabilitation. Precise surgical intervention enables adequate preparation of the oral environment for prosthetic replacements ensuring improved functionality and aesthetics of the patient's smile. This case illustrates the successful application of contemporary surgical techniques in pre-prosthetic surgery.

Keywords: Bilateral mandibular tori, pre-prosthetic surgery, piezo surgery

FIELD OF DENTISTRY: Dental implantology
Type of presentation: Oral presentation

IMPRESSION METHODS IN IMPLANTOPROSTHETICS

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ABSTRACT

According to the definition, an impression is a negative imprint of hard and soft tissues in the mouth. In the digital protocol, analog impressions have been replaced with scanning and in that case, an impression is a positive imprint of hard and soft dental tissues.

When crafting an implant-prosthetic piece, it is important to transfer a precise three-dimensional positioning of an implant, as well as its relation with the neighboring structures in the mouth, into the dental laboratory. The situation of the mouth is transferred through impressions. In the implant-prosthetic therapy, two impression methods are used: analog (conventional) and digital impressions. Analog (conventional) impressions can be done using the methods of open and closed tray. The impression can be done on the abutment and on the implant level. When it comes to digital impression, it is necessary to use the intraoral scanner and its additional parts for scanning. All methods have their indications, as well as their advantages and disadvantages.

The aim of this thesis is to describe the most commonly used impression methods, the process of the impression, impression materials, and to highlight the importance of the impressions in the implant-prosthetic therapy.

Key words: implant-prosthetics, conventional impression, digital impression, implant

ABSTRACTS OF POSTER PRESENTATIONS

FIELD OF DENTISTRY: General dental practice

Type of presentation: poster presentation

THE IMPORTANCE OF THE DENTIST IN THE DIAGNOSIS OF PARANASAL SINUS CYSTS (MUCOCOELE) – CASE REPORT

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ABSTRACT

Introduction: Cysts in the paranasal sinuses can be defined as benign growths filled with liquid. The most common cyst occurring in the maxillary and frontal sinus is a mucocele. Mucocele is a benign change filled with mucus.

Material and method: Patient Č.S. (14 years old) comes to the dental clinic with an escort mother, after several months of inability to establish adequate diagnostics for her health problem. Hetero-anamnestic, the mother states the presence of pain and swelling in the upper jaw area on the left side, backwards for a long period of time. Intense headaches are present creating emotional difficulties with anxiety symptomatology. Clinical examination established the existence of all permanent teeth with the absence of advanced caries lesion. The patient is referred for an OPG scan showing a radiological change in the lumen of the maxillary sinus on the left side, suspicious for a mucocele. According to the radiological findings, the patient is referred to maxillofacial surgery, where an operation and PH verification is performed confirming the referral diagnosis (mucocele).

Result: Through this case presentation, we see the importance of including dentists in diagnostics and therapeutic protocol in order to provide adequate therapy to the patient in a timely manner.

Conclusion: Interdisciplinary cooperation is important in order to establish a precise diagnosis when working with patients and dentists are an important link in the health system.

Key words: cyst, maxillary sinus, OPG, mucocele

FIELD OF DENTISTRY: Preventive Dentistry

Type of presentation: poster presentation

NUTRITION AND ORAL HEALTH

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ABSTRACT

A diet rich in carbohydrates, proteins and minerals is important for the normal functioning of a healthy human organism. Nutrition and oral health are connected in many ways. Inadequate nutrition can affect oral health including caries, periodontal diseases, diseases of the oral mucosa and infectious diseases, and it is also important in craniofacial development. Diet affects teeth during development and malnutrition can worsen periodontal and oral infectious diseases. However, the most significant effect of nutrition on teeth is the local effect of nutrition in the mouth on the development of caries and enamel erosion.

Some research suggests that adults who are dieters, vegetarians and vegans have an increased risk of periodontal problems and tooth decay, as well as dental erosion.

The aim of this work is to link nutrition, oral health and oral diseases and to present dietary and dental habits that will prevent negative outcomes.

The paper was written by reviewing and analyzing the relevant literature of scientific works. We used relevant scientific data published in journals that were downloaded from PubMed, ResearchGate, Google Scholar and other databases.

Diet protocols, if not implemented in the right way, can lead to eating disorders (bulimia nervosa, anorexia nervosa). Therefore, it is necessary to notice the symptoms of eating disorders in time, to establish fast and aggressive therapy before more serious forms of disorders and irreversible physical damage develop.

Doctors of dental medicine play an important role in the early detection of eating disorders because the first symptoms most often appear orally and extraoral.

Keywords: nutrition, oral health, diet, oral diseases

FIELD OF DENTISTRY: preventive dentistry
Type of presentation: poster presentation

DENTAL HEALTH CARE IN THE PUBLIC SECTOR OF THE FEDERATION OF BOSNIA AND HERZEGOVINA FOR THE PERIOD 2020–2022

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ABSTRACT

Introduction and aim: Dental health care in the FBiH is organized through three levels - primary, specialist and tertiary health care and is provided in both the public and private sectors. This analysis is based on official data from the Institute for Public Health of the Federation of Bosnia and Herzegovina and their official publications.

Results: In the public sector, there are 557 dentists employed (which represents 26 dentists per 100,000 inhabitants) and 624 dental nurses/technicians (29 per 100,000 inhabitants). The average number of inhabitants per dentist was 3,872. The highest number of inhabitants per dentist was recorded in the Zeničkodobojski Canton (7,492) and the Unsko-sanski Canton (7,285), while the lowest number was in the Sarajevo Canton (1,741). In 2022, a total of 789,529 visits to dental services in the public sector were recorded, which is an increase compared to previous years. On average, there were 5.2 visits per day per dentist. The highest average number of visits per dentist was in the Bosansko-podrinjski Canton (9 visits per day), while the lowest average number of visits per dentist was recorded in the Unsko-sanski, Centralnobosanski, Hercegovačko-neretvanski, Zapadnohercegovački and Canton 10 (an average of 4 visits per day). The ratio of the first to follow-up visits in dental care was 1:1.4. This statistic indicates a stable ratio between new patients and those coming for follow-up exams and treatments.

Discussion and conclusion: The display of the average number of daily visits per dentist for the period 2020 to 2022 by cantons shows variations in the workload of dentists in different parts of the FB&H, which may indicate a need for better resource allocation and health policy planning.

Keywords: dental health care, public sector

FIELD OF DENTISTRY: preventive dentistry
Type of presentation: poster presentation

ANALYSIS OF ORAL HEALTH IN THE FEDERATION OF BOSNIA AND HERZEGOVINA: REGISTERED DISEASES

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ABSTRACT

Introduction: The World Health Organization considers various oral conditions, such as dental caries, periodontal diseases, tooth loss and orodental trauma to be serious public health problems. Oral diseases impose a significant burden and economic cost on the health system. **Aim:** The analysis of diseases related to oral health is based on official data from the Institute for Public Health of the Federation of Bosnia and Herzegovina.

Results: In 2022, at the level of primary health care, 494,767 diseases, conditions and injuries were registered in the public sector being 2.9% less compared to 2021. The most common disease is dental caries accounting for 38.7% of all diseases with a rate of 889 per 10,000 inhabitants. Among men, caries accounts for 46.8% (rate of 847/10,000) and among women, 53.2% (rate of 928/10,000). The second most common disease is pulp and periapical tissue diseases, accounting for 28.4% with a rate of 652 per 10,000 inhabitants. In all age groups, the leading diseases are dental caries and pulp and periapical tissue diseases. Dentofacial anomalies, including malocclusions, are highly ranked among children up to 4 years and the age group of 5-19 years.

Discussion and conclusion: These data indicate stable trends in dental diseases and highlight the need for continuous prevention and education in the field of dental health. To improve the oral health of the population, it is necessary to systematically and comprehensively implement existing preventive measures, as well as design new preventive programs based on educational activities aimed at developing a sense of full responsibility in each individual.

Keywords: dental health care, diseases in dental health care

FIELD OF DENTISTRY: Pediatric dentistry
Type of presentation: Poster presentation

AMELOGENESIS IMPERFECTA

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ABSTRACT

Introduction: Amelogenesis imperfecta is a hereditary enamel malformation. The clinical picture is characterized by generalized enamel defects, both in primary and permanent dentition. It is believed to be the result of a mutation at the level of the genes responsible for amelogenesis. It is inherited as an autosomal dominant, recessive or X-linked type of inheritance. Clinically, it appears as a hypoplastic, hypo-maturational, hypocalcification and combined hypo-maturational-hypoplastic form associated with taurodontism. The frequency of AI is 1:14,000.

Materials and methods: a seven-year-old boy accompanied by his mother comes to the children's and preventive dentistry office at the Stari Grad Health Center. Hetero-anamnesis shows that the boy's baby teeth started crowning very soon after they erupted. Clinically, the baby teeth are presented without enamel, the first central incisors had hypomineralization and post-eruptive enamel fractures. In the therapy plan, we have considered minimal invasive conservative treatment of central incisors. And after assessing the condition of the first permanent molars and establishing better cooperation of the child, they will be treated with steel crowns.

Conclusion: the presence of amelogenesis imperfecta represents a kind of challenge for the clinician. An interdisciplinary approach is necessary to restore function, aesthetics and phonetics to the patient.

Keywords: amelogenesis imperfect, defect enamel, hereditary, treatment

FIELD OF DENTISTRY: Pediatric dentistry
Type of presentation: Poster presentation

DENTINOGENESIS IMPERFECTA (DENTIN DYSPLASIA OR HEREDITARY OPALESCENT DENTIN) – CASE REPORT

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ABSTRACT

Introduction: Dentinogenesis imperfecta is a hereditary anomaly of the tooth structure. If it is not associated with osteogenesis imperfecta, it can be characterized as hereditary opalescent dentin. It is characterized by the opalescent color of the teeth, the teeth are gray-blue or brownish like amber with square or bell-shaped crowns that very quickly abrade to the level of the gingiva.

The aim of the work: The aim is to show the characteristic appearance of this structural anomaly for easier diagnosis in practice.

Materials and methods: A fourteen-year-old female patient accompanied by her mother came for an examination at the children's preventive dentistry office. The clinical examination showed permanent dentition teeth with an opalescent appearance, brownish color like amber, which is the pathognomonic appearance of teeth in dentinogenesis imperfecta. Heteroanamnestically, we get the information that the patient's mother and older sister had the same structural anomaly, while it did not manifest itself in the twin sisters.

Conclusion: Dentinogenesis imperfecta occurs in one in 6000-8000 children and it can be said that it is rarely encountered in clinical practice. We hope that this case report will help fellow clinicians in making a diagnosis.

Keywords: Dentinogenesis imperfecta, hereditary anomaly, opalescent, characteristic, rarely

FIELD OF DENTISTRY: Pediatric dentistry
Type of presentation: poster presentation

ENDODONTIC TREATMENT OF DECIDUOUS TEETH WITH CLINICALLY POOR PROGNOSIS

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ABSTRACT

Introduction: Faster caries progression in deciduous teeth easily leads to pulp infection. For this reason, pulp diseases in deciduous dentition are very common, mainly in the form of chronic asymptomatic infections. The standard endodontic procedures such as pulp extirpation, pulpectomy, partial pulpectomy, etc., require full cooperation with patient. LSTR is a method of sterilization of lesions and tissue repair based on the repair of pulp and/or periodontal tissue of deciduous teeth under the action of a combination of antibiotics. The technique does not include root canal instrumentation. The LSTR method is one of the good endodontic therapeutic alternatives for affected deciduous teeth with a poor prognosis, which would otherwise lead to premature extraction. Aim of this research was to evaluate the clinical success of the LSTR method in daily clinical practice being applied to affected deciduous teeth with irreversible pulp tissue infections and poor prognosis, and to observe the reduction/absence of their clinical and radiological symptoms.

Material and methods: The sample consisted of patients who had one of their deciduous molars treated with the LSTR technique. Each patient was clinical and radiological evaluated.

Results: Already after the initial treatment, a significant reduction in clinical complaints was observed. At the follow-up examination 12 months later the initial treatment with the LSTR method, the clinical and radiological success of the method was over 95%.

Conclusion: The LSTR method as a non-instrumental endodontic technique in the treatment of irreversible pulpal infections of deciduous molars with a poor prognosis showed success in clinical and radiological follow-up for 12 months.

Keywords: deciduous molars, endodontic treatment, LSTR.

FIELD OF DENTISTRY: Pediatric dentistry
Type of presentation: poster presentation

ORAL HEALTH STATUS IN CHILDREN AT PUBLIC KINDERGARTENS OF CANTON SARAJEVO

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ABSTRACT

Introduction: Dental caries as multifactorial disease firstly appears in form of early childhood caries. Preschool children due to difference in structure of enamel and dentin, and inadequate parental care and lifestyle as well, are sensitive category when it comes to the occurrence and development of dental caries. Preventive measures at this age have big potential for reducing risk for transmitting dental caries on permanent dentition. Aim: To show oral health status at children of preschool age and educate their parents and teachers at public kindergarten.

Patients and methods: This study included preschool children aged from 3 to 6 years with their oral health status evaluated according to the WHO Oral health Survey guidelines within the 2-year period. Their parents and kindergarten teachers were educated simultaneously.

Results: Oral health status slightly worsened in 2023 compared to 2022. Oral treatment care indexes have increased in 3- and 4-year-old children, while at the same time decreased in 5- and 6-year-olds.

Conclusion: The role of parents has crucial impact in preservation of their children's oral health and it is important to strengthen it. Educational institutions should recognize importance of healthy lifestyle and dietary habits in purpose of oral diseases prevention.

Keywords: caries, deciduous teeth, preschool age, educational institutions

FIELD OF DENTISTRY: Restorative and adhesive dentistry
Presentation type: poster presentation

CONTROL, MAINTENANCE AND APPLICATION OF POLYMERIZATION LAMPS AMONG DENTISTS IN THE SARAJEVO CANTON

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ABSTRACT

Light polymerization is the most common polymerization method for resin-based dental materials. Secondary caries, filling fractures, discoloration, loss of anatomical tooth shape due to wear and reduced retention of the fillings are associated with inadequate polymerization. The aim of this study was to investigate the types of dental curing lights used by dentists in the Sarajevo canton, as well as their control and maintenance routines.

The research was conducted through an anonymous survey of dentists in the Sarajevo canton employed in state institutions and private practices. 120 surveys were sent out and 108 dentists (90%) returned the completed questionnaire. Descriptive statistics methods, as well as the chi-square test and the binomial test at the significance level of $p < 0.05$ were employed to process the data using Microsoft Office Excel.

This research showed that the largest number of surveyed dentists (87%) use LED lamps in their daily practice ($p = 0,00000001$). None of the respondents uses plasma and laser lamps for polymerization, while a certain number of respondents (3%) aren't familiar with the type of lamp used. The radiation intensity of polymerization is not measured by more than half of the respondents (62%) because they lack an available radiometer. The majority of dentists, 69%, have no knowledge of the radiation intensity of the lamp they use daily. Statistical analysis using the chi-square test showed that dentists in private practices control lamps significantly more ($p = 0.044864$) than in state institutions. Almost one-third of respondents (29%) control the lamp solely by visual means, specifically by observing the light guide.

Based on the results, it was determined that there are certain shortcomings in the daily practice of the surveyed dentists. Continuous education programs that emphasize the value of dental radiometers and regular polymerization lamp monitoring are needed.

Keywords: Light curing units, dental radiometers, irradiance, questionnaire.

FIELD OF DENTISTRY: Dental pathology

Type of presentation: poster presentation

SUPERNUMERARY TOOTH IN THE MAXILLARY INCISOR REGION – MESIODENS – CASE REPORT

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ABSTRACT:

Mesiodens is a supernumerary tooth with a conical shape and usually a short root, localized in the incisor area. Research has shown that only 25% of supernumerary teeth in the permanent dentition erupt, while the rest remain impacted.

An eleven-year-old boy accompanied by his mother came to our practice due to aesthetic problems caused by a supernumerary incisor in the upper jaw. The orthopantomogram shows the normal shape of the mesiodens root. The treatment plan included extraction of the supernumerary tooth under local anesthesia. The intervention itself went without any complications. A control examination after ten days showed normal healing and recovery of soft tissues.

Key words: supernumerary tooth, mesiodens, incisor

FIELD OF DENTISTRY: Endodontics

Type of presentation: poster presentation

ENDODONTIC TREATMENT OF MANDIBULAR PREMOLARS WITH ATYPICAL ROOT CANAL MORPHOLOGY - CASE REPORT

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ABSTRACT

Introduction: Mandibular premolars typically have one root and one canal. However, variations from standard root and canal morphology are possible. This case report aims to describe the diagnostic and therapeutic steps in the endodontic treatment of two-canal mandibular premolars.

Case report: A 45-year-old female patient was presented to the dentist for prosthetic rehabilitation of the lower jaw teeth. The intraoral examination revealed a significant vestibular inclination of teeth 34 and 45, along with deep class II composite restorations. The retro-alveolar scans from different angles showed the presence of an additional canal on teeth 34 and 45 being later verified by 3D CBCT imaging. The endodontic treatment of mandibular premolars with two canals was successfully completed and appropriate control radiographs were taken.

Conclusion: Through careful analysis of radiographic images and examination of the pulp chamber's floor, it is possible to identify the atypical root canal morphology in the mandibular premolars. The eccentric position of the orifice implies the presence of an additional canal. In most cases, deviation from the average root canal morphology in the same patient is bilateral.

Keywords: mandibular premolar, root canals, morphology, endodontic treatment

FIELD OF DENTISTRY: Endodontics

Type of Presentation: Poster Presentation

TISSUE NECROSIS AS A COMPLICATION FOLLOWING THE APPLICATION OF PARA-FORMALDEHYDE-BASED DEVITALIZATION PASTE IN ENDODONTIC TREATMENTS – A CASE REPORT

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ABSTRACT:

Introduction: Agents used for pulp devitalization in cases where local anesthetics are ineffective can exhibit toxic effects on surrounding tissues leading to necrosis. Timely therapeutic intervention may prevent further toxic effects, although sometimes efforts may not entirely prevent deeper penetration and disruption of bone integrity.

The aim of this study is to present complications arising from inadequate application of paraformaldehyde-based pulp devitalization agents and their treatment.

Materials and Methods: A case of a patient receiving pulp devitalization on tooth 36 due to uncontrollable pain will be presented, where the exposed agent led to initial necrosis of surrounding tissue. The patient presented at the clinic on Friday due to acute pain in tooth 36 following clinical examination and analysis of RVG imaging. Local anesthesia was administered. However, complete pain-free work was not achieved. After removal of existing filling and chamber trepanation, the pulp devitalization agent was applied, covered with cotton, and temporary GJC filling was placed using a matrix. The patient returned to the clinic on Monday reporting mild discomfort in the area and changes in the lingual mucosa adjacent to the treated tooth. Examination revealed damage to the interdental papilla and marginal gingiva, the temporary filling and cavity content were removed, and the patient was referred for further treatment at the Clinic for Oral Medicine and Periodontology.

Results: The therapeutic protocol and recovery process will be presented.

Conclusion: The use of paraformaldehyde-based devitalization agents in endodontics is effective but not without risks, requiring careful application to avoid contact with the gingiva and diffusion into surrounding tissues.

Keywords: paraformaldehyde, necrosis, pulp devitalization

FIELD OF DENTISTRY: Endodontics
Presentation type: Poster presentation

THE SIGNIFICANCE OF DIAGNOSTIC PROTOCOL IN APICAL PERIODONTITIS CAUSED BY TRAUMATIC OCCLUSION: A CASE REPORT

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ABSTRACT

Introduction: Apical periodontitis is an inflammatory lesion of the apical periodontium, most commonly caused by microorganisms from the infected root canal. However, it can occur due to traumatic occlusion in teeth with vital pulp tissue. Periapical lesions of pulpal origin, as well as lesions caused by traumatic occlusion, may produce similar symptoms and radiographic manifestations. This case report aims to demonstrate the significance of thorough implementation of clinical protocol in identifying apical periodontitis caused by traumatic occlusion.

Case report: A 27-year-old female patient was presented for a routine dental examination. She reported a mild sensation of pressure in the area of the upper left central incisor's root apex. Clinical examination revealed that tooth 21 was intact but makes premature contact with its antagonist, tooth 31. Sensibility test results from the electric pulp tester were positive. Imaging-wise, RVG showed a radiolucency around the apex of tooth 21. Following confirmation, it was measured to a 2.84 mm lesion on the 3D CBCT image. Finally, the anamnestic and diagnostic data led to the diagnosis of apical periodontitis due to traumatic occlusion.

Conclusion: Apical periodontitis caused by pulp-related disease or by excessive force on teeth can present with similar radiographic features. X-ray diagnostics should have a major, although not definitive role in diagnostic process in endodontics. A simple, reliable and safe diagnostic procedures such as a sensibility test, combined with a detailed medical history and clinical examination, may be crucial for successfully identifying a periapical disorder and establishing the necessary course of treatment.

Keywords: traumatic occlusion, apical periodontitis, sensibility test, diagnostic protocol

DENTAL SPECIALTY: Orthodontics
Type of presentation: Poster presentation

OLIGODONTIA – TREATMENT OPTIONS

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SUMMARY

Introduction: Oligodontia is the congenital absence of six or more teeth, excluding third molars, both primary and permanent dentition. In oligodontia, missing teeth are the ones that did not erupt inside the oral cavity, clinically, and that are not visible radiographically, nor are they showing any signs to appear. Previous research has shown that the prevalence of missing teeth in children increased significantly during the twenty-first century.

The aim of this paper is to present the treatment options for patients with oligodontia.

Case presentation: A 12-year-old female patient visited the Department of Orthodontics with the complaints of missing the majority of teeth. Clinical examination and OPG analysis revealed that the patient does not have a total of thirteen teeth. Treatment is proposed in consultation with a specialist in prosthodontics.

Conclusion: Patients with oligodontia requires multidisciplinary treatment involving the cooperation of an orthodontist, specialist in pedodontics and prosthodontics for an adequate therapy plan and its implementation.

Keywords: oligodontia, multidisciplinary approach, missing teeth

FIELD OF DENTISTRY: Oral Medicine

Type of presentation: Poster Presentation

ORAL MANIFESTATIONS OF DYSTROPHIC EPIDERMOLYSIS BULLOUS - CASE REPORT

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ABSTRACT

Introduction: Epidermolysis bullosa is a rare genetic disease characterized by severe sensitivity of the skin and, in some patients, mucous membranes with the formation of bullae and ulcerations. There are three basic types of the disease: Epidermolysis bullosa simplex (intraepidermal bulla), Epidermolysis bullosa junctional (border bulla) and Epidermolysis bullosa dystrophic (dermal bulla). The prominent clinical characteristic of all three forms is the development of bullae in mucosa or skin in response to minor trauma. Ulcerations heal with scars creating contractures and reducing mobility.

Materials and methods: Oral manifestations of dystrophic epidermolysis bullosa include multiple ulcerations of the oral mucosa, gingival inflammation, microstomia, ankyloglossia and vestibular sulcus insufficiency. Ulcerations are also present on the skin healing with the scars. Ulcerating of the hands and feet followed by scarring fuses the digits into "mitten" hands and feet, with contractures and pseudo-syndactyly.

We will present the case of a 30-year-old patient, M.K. who reported regularly to the Department and Clinic for Oral Medicine and Periodontology due to problems in the oral cavity caused by an underlying disease, as well as the need for initial periodontal treatment.

Conclusion: Therapy of oral and skin manifestations is symptomatic depending on the type of disease and degree of mucous membrane involvement.

The goal of therapy for patients is to prevent or remove complications, raise the quality of life and delay complications.

Therapy also includes education of patients and their family members and a multidisciplinary approach of experts from different specialties.

Keywords: bulla, epidermolysis, oral manifestations.

FIELD OF DENTISTRY: Oral Medicine

Type of presentation: poster presentation

CHANGES IN THE ORAL MUCOUS MEMBRANES DURING THE USE OF TOBACCO PRODUCTS (SNUS), CASE REPORT

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ABSTRACT:

Introduction: Changes in the oral mucosa and gingiva can be of different origin and appearance. Erosion of the mucous membrane means a surface defect whose bottom is at the level of the epithelium, heals without a scar and is painful due to the exposure of nerve fibers. An ulcer is a defect located in the deeper layers of the oral mucosa. The bottom is under the epithelium in the connective tissue and muscles and heals with a scar. Snus is a "smokeless" tobacco product that is packaged in bags and thus prepared for use. It dissolves in the oral cavity in contact with the mucosa of the fornix and in the presence of saliva. The aim of the paper: To show the changes in the oral mucous membranes as a result of the use of tobacco products.

Material and methods: The paper will present a 13-year-old patient with changes in the mucous membranes and gingiva caused by the use of tobacco products (snus). The patient came to the Clinic for Oral Medicine and Periodontology after an examination in the reception clinic of the Faculty of Dentistry, on the instructions of the practicing pedodontics. The referring diagnosis was aphthous stomatitis and gingivitis. After taking anamnestic data and a clinical examination, changes are observed below the level of the mucous membrane in the fornix and on the marginal gingiva in the region of teeth 12 and 13. The changes are irregularly shaped and painful, and their appearance and localization may indicate the use of tobacco products such as snus. Results: The therapeutic protocol for treatment will be presented and will be commented on with the experiences of other authors.

Conclusion: The use of tobacco products (snus) can be harmful in several ways. In addition to damaging the oral mucosa and gingiva, this product can develop addiction.

Key words: gingivitis, oral health, tobacco product - snus, ulcer, erosion

FIELD OF DENTISTRY: Oral Medicine

Type of presentation: poster presentation

FREQUENCY OF DEVELOPMENTAL ANOMALIES AND MUCOSAL INFLAMMATION OF THE TONGUE AMONG FOURTH-YEAR DENTISTRY STUDENTS AT THE UNIVERSITY OF SARAJEVO

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ABSTRACT

Introduction: The tongue is a muscular organ covered dorsally by highly specialized tissue and ventrally by protective mucosa. Pathological changes of the tongue can be classified into three main groups: anomalies, inflammations and tumors. Developmental anomalies and inflammations are common occurrences, often associated with systemic conditions such as diabetes, allergies, anemia as well as harmful habits. The use of tobacco products and alcohol is frequently linked to the changes in the tongue.

Objective: To present the frequency of developmental anomalies and inflammations of the tongue among fourth-year dentistry students at the University of Sarajevo.

Materials and methods: The study will be conducted on 50 participants, fourth-year dentistry students at the University of Sarajevo. General anamnestic data will be collected through a questionnaire, along with data on harmful habits such as cigarette smoking, hookah use and alcohol consumption. A clinical examination of the oral cavity will be performed, focusing on the examination of the tongue, as well as tests for vito-pressure, vito-adhesion and native examination for *Candida albicans*.

Results will include a statistical evaluation of all observed parameters.

Discussion will involve the interpretation and discussion of the obtained results comparing them with relevant data from the literature.

Conclusions will be formulated as precise responses to the research objectives.

Keywords: tongue, developmental anomalies, inflammation, students

FIELD OF DENTISTRY: Periodontology

Type of presentation: Poster presentation

A CASE REPORT OF COMPLICATED PERIODONTITIS ASSOCIATED WITH THE COMPLICATIONS OF A MANDIBULAR PROGNATHISM SURGERY

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ABSTRACT

Introduction: Periodontitis is an inflammatory disease affecting the tooth supporting structures, while mandibular prognathism appears as a skeletal irregularity characterized by an excessive mandibular growth.

This presentation aims to present the case of a patient with complicated periodontitis along with the complications arising from the surgical correction of mandibular prognathism.

A case report: A female patient N.I. (1980.) showed up at the Department of Oral Medicine and Periodontology due to teeth mobility presented in the lower jaw, making mastication difficult. The patient also reported pain in the temporomandibular joint, all of which affected the patient's quality of life. From the medical history, it was found out that the patient had undergone four mandibular prognathism surgeries. Anamnesis, clinical examination and radiographic diagnosis revealed a lack of bone on the right side of the lower jaw, the presence of pockets of the remaining teeth, malocclusion and consequently, pathological changes of the temporomandibular joint, limited movement of the lower jaw and unaesthetic extraoral facial asymmetries. The periodontal part of the therapy involved removing dental plaque and calculus and also subgingival curettage to prevent further bone and remaining teeth loss, consultations with a dental prosthetics specialist regarding indications and contraindications for further prosthetic treatment and also examination of the condition of an already existing prosthetic restoration. The patient was referred to an oral or maxillofacial surgeon for consultations regarding bone augmentation.

Conclusion: This case report highlights the importance of a multidisciplinary approach in treating patients with complex dental problems and emphasizes the need for a thorough diagnosis and individualized treatment plan to achieve a successful treatment outcome.

Keywords: periodontitis, mandibular prognathism surgery, TMJ, prosthetic treatment of the patient

FIELD OF DENTISTRY: Oral surgery
Type of presentation: poster presentation

CLINICAL RESULT OF IMMEDIATELY PLACED IMPLANTS

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ABSTRACT

Introduction: Immediate implantation shortens the number of surgical procedures and is therefore more comfortable for the patient but it is not indicated in all cases. Tooth extraction is a traumatic procedure. The buccal lamella of the alveolar ridge is particularly susceptible to strong resorption, the loss of which occurs as early as two weeks after tooth extraction. After twelve months, the width of the alveolar ridge is further reduced by about 50%. The buccal lamella is mostly nourished via the periodontal ligament and periosteum. As the periodontal ligament is damaged by tooth extraction, this route of nutrition is lost, feeding is interrupted and resorption inevitably occurs. Immediate postextraction implantation is the procedure of immediate installation of a dental implant, immediately after tooth extraction. Factors that influence the positive outcome of immediate implantation are: implant positioning, platform switching concept, bone preparation protocol, buccal and palatal thickness bones, patient-dependent factors (smoking, maintenance of oral hygiene...).

The purpose of this study is to determine the consequences and benefits of immediate implantation, in terms of preserving the alveolar bone.

Methods: The study represents a clinical, prospective, comparative, randomized and blind study of a therapeutic-analytical and clinical-applicative nature.

Results: The study showed a statistically significant reduction in postoperative resorption of the buccal lamella in patients with an immediately placed implant.

Conclusion: When considering the possibility of immediate implantation, clinicians should take into account all factors that can lead to the failure of the procedure. The amount of newly created bone is directly related to the patient's age, whether he is a smoker or non-smoker, the thickness of the alveolar bone wall, the degree of crestal bone resorption, the type of implant and its position within the bone.

FIELD OF DENTISTRY: Oral Surgery
Type of presentation: poster presentation

COMPLEX ODONTOMA ASSOCIATED WITH LOWER IMPACTED CANINE – OWN CASUISTRY

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ABSTRACT

Introduction: Odontoma, the most common odontogenic tumor. The basic characteristics of odontomas are slow growth and benignity. They are mostly asymptomatic and are discovered incidentally after radiographic imaging of the jaws. However, if not diagnosed and treated in time, it can cause complication. The etiology of its formation is not fully understood, but trauma, infection and genetic factors are cited among the causes. Odontoma has two morphological forms: odontoma compositum and odontoma complex. Diagnosis of odontoma involves, in addition to anamnesis and clinical examination, radiographic imaging and CBCT diagnostics to determine the size, shape and location of the tumor as precisely as possible. The treatment of odontoma is surgical and involves excision of the tumor.

Material and methods: In this paper, we presented the case of a fourteen-year-old female patient who developed swelling in the region of tooth 43. Detailed clinical examination and CBCT diagnostics revealed a change in the right side of the mandible characterized as an odontoma, and the presence of an impacted canine in a specific horizontal position. The surgical protocol involved the extraction of the deciduous canine and complete removal of the tumor. The successful surgical excision of the tumor was performed using a minimally invasive intraoral approach with maximum bone preservation. The wound was primarily sutured.

Result: The authors presented a detailed diagnostic and therapeutic protocol for treating complex odontoma associated with an impacted lower canine on the right side through a case from their own casuistry. The histopathological report confirmed the diagnosis of complex odontoma. The described case resulted in a positive outcome, which was confirmed through regular clinical and radiological follow-up examinations.

Conclusion: Early diagnosis and adequate treatment of odontogenic tumors are key for preserving oral health and preventing potential complications.

Key words: odontoma, odontogenic tumor, surgical therapy, impacted tooth.

FIELD OF DENTISTRY: Dental traumatology

Type of presentation: Poster presentation

TREATMENT OF DENTAL INJURIES IN DAILY DENTAL PRACTICE – PRESENTATION OF SEVERAL CASES

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ABSTRACT

Introduction: The frequency of dental trauma and daily need to treat children with dental injuries require dentists to have knowledge and proper therapeutic procedures in all stages of treatment.

The aim of the work: Presenting cases from clinical practice and sharing experience with colleagues to help them in daily work.

Materials and methods: Patient M.K. born in 2015., came to the dental office after an injury from a fall from a scooter during which tooth avulsion occurred on tooth 21. After finding the tooth, repositioning is done in the alveolus and a wire-composite splint is placed.

Patient R.I. born in 2009., came to the oral surgery office accompanied by his father, and after an injury in physical education class, teeth 11, 21 and 22 were luxated. The teeth are repositioned and a splint is placed.

Patient H.E. born in 2011., came to the dental office accompanied by his mother after an injury to teeth 11 and 21. After a clinical examination and X-ray analysis, the tooth is repositioned and a wire-composite splint is placed.

Conclusion: Considering the frequency of dental traumas it is necessary to educate children and parents on how to act in the event of trauma because their timely reaction and the method of transporting the avulsed tooth greatly affect the outcome of the treatment.

Keywords: Tooth injury, knowledge, procedure, splint

FIELD OF DENTISTRY: Prosthodontics

Type of Presentation: Poster Presentation

THE SAGITTAL CONDYLAR INCLINATION IN DIFFERENT DENTAL STATUS

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ABSTRACT

Introduction: The inclination of the sagittal condylar path is influenced by numerous factors and determines the kinematics of the temporomandibular joint.

Methods: The sample includes 3D CBCT scans of patients which were earlier taken for diagnostic and treatment purpose. The subjects' CBCT scans were divided according to dental status: Group I - partially edentulous with preserved interocclusal relationships (30); Group II - partially edentulous without preserved interocclusal relationships (30). CBCT scans were placed in the multiplanar reconstruction position. The axial section where the condyle has the widest mediolateral diameter was the reference view for sagittal section reconstruction. The inclination of the articular eminence is measured on the sagittal section as the angle between the plane passing through the highest point of the glenoid fossa and the lowest point of the articular eminence and the Frankfurt horizontal. For data analysis and measurements, Sidexis 4 software was used.

Results: The analysis included a total of 60 CBCT scans of patients. The average age of participants in Group II was significantly higher compared to Group I ($p < 0.013$). Although the average values of the sagittal condylar angle of the right and left temporomandibular joints were higher in Group I compared to Group II, the difference was not significant ($p = 0.252$; $p = 0.135$), as well as between genders.

Conclusion: Differences in the inclination of the sagittal condylar path were not significant across different dental statuses.

Keywords: Sagittal condylar path, CBCT, dental status

FIELD OF DENTISTRY: Endodontics

Type of presentation: oral presentation

ENDODONTIC AND SURGICAL RETREATMENT OF UPPER INCISORS

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ABSTRACT

Introduction: This case report describes the endodontic and surgical retreatment of teeth 11 and 12, 14 years after primary endodontic and surgical therapy, which was performed due to the consequences of trauma in an 11-year-old girl. The primary goal of this paper is to point out the need for longer follow-up of endodontic therapy outcomes.

Case report: A twenty-five-year-old girl presents to the Clinic for Dental Pathology with endodontics due to the development of a fistula in the projection of the apex of the upper right central incisor, which was also confirmed by a clinical examination. Analyzing the panoramic image taken in the same visit, inhomogeneous endodontic filling of the root canals and radiolucent zones in the periapical region of teeth 11 and 12 are observed. The same teeth are also noticeably shorter, which is a consequence of the initial apicotomy that the patient also mentions in the dental history. The origin of the fistula was determined by fistulography, and the size of the periapical change by segmental CBCT. The removal of the previous filling is approached with the help of ultrasound and endodontic revision files. The working length is determined by an orientational retroalveolar image with test gutta-perchas in the root canals, due to the inconsistent and unreliable display of the working length on the apex locator. Irrigation of the root canals was done with 3% NaOCl, while the final irrigation was done with 2% chlorhexidine digluconate, and after copious rinsing with saline solution. Intracanal calcium hydroxide medication is renewed every 20 days for 2 months. Due to the persistent fistula, and in consultation with the oral surgeon, a new apicotomy was performed on

teeth 11 and 12. Preoperatively, the root canals are obturated using the cold lateral condensation technique. On the retroalveolar image 3 months later, a reduction of periapical lesions is evident, and clinically the patient is symptom-free and without fistula. One year after the endodontic and surgical retreatment, the retroalveolar image shows the healing of the bone defect with the absence of signs and symptoms of periapical disease.

Conclusion: Dentists should be aware of the need for longer-term follow-up of endodontic therapy outcomes, especially those teeth with periapical changes due to their regression monitoring.

Keywords: endodontic retreatment, fistula, apicotomy, control examinations

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